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*P. L. Hollingsworth*

# A SYNOPSIS,

OR

## GENERAL VIEW

OF THE PRINCIPAL

## THEORIES OR DOCTRINES

OF

## DISEASES,

WHICH HAVE PREVAILED OR BEEN TAUGHT AT  
DIFFERENT PERIODS

TO THE PRESENT TIME.

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"Nothing extenuate,

"Nor ought set down in malice."

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## PREFACE.

THE Author of the following Synopsis, or general view of the *theories* or doctrines of diseases, that have prevailed or been taught at different periods, (compiled from the most authentic sources) has been induced to publish it, from a conviction that a correct knowledge of the nature and proximate causes of diseases, or that condition of the system on which the symptoms of diseases depend, would be of incalculable benefit in conducting to safe and successful practice. And as, next to *peace of mind*, reflection upon an innocent and useful course of life, and a soul aspiring after perfection, there is nothing in this world more to be desired than health of body, and a knowledge of the means best adapted to remedy or alleviate the various ills of life, he hopes, as he has “nothing extenuated, nor ought set down in malice;” but has reviewed each theory with freedom and impartiality, and has endeavoured to the best

of his abilities to point out the merits as well as the defects of each, that the publication taken in the aggregate, will not only contribute to the entertainment of those that are engaged in medical studies, but aid them in separating truth from the almost infinitude of error with which it is blended.

The diseases to which the human body is liable, are so various, and frequently so complicated, that it requires great judgment to distinguish them with accuracy, as well as a perfect knowledge of the philosophy or laws of the animal economy in health and disease, to treat them with safety and propriety. A constant and diligent attendance on the sick may instruct us in the external aspect of diseases, and enable us with some degree of certainty to prognosticate their issue, but without a knowledge of their proximate cause or that condition of the system from which the symptoms proceed, such knowledge can never furnish us with any other than the mere fortuitous means of removing them. How blind and dangerous would be all attempts to cure the disorders of the eye without a knowledge of its

structure, and an acquaintance with the theory of vision? The empiric, or one who confines himself entirely to experience and observation, regardless of the causes of diseases, is ignorant of both. Suppose him consulted in a case of gutta serena. No external defect appears, no pain is complained of, and the patient's health in other respects does not appear to be impaired. By what symptoms will the empirical oculist be able to ascertain the seat and immediate cause of the disease, or upon what principles will he proceed in the treatment of it? Uncertainty, and consequently confusion and danger, must necessarily attend his random practice. By the laws of the animal economy, a certain sympathy subsists between different parts of the body, by which the disordered state of one organ impairs the functions of another. The head and stomach, for instance, have an almost universal consent with the rest of the system, and of course are subject to various and sometimes opposite kinds of indisposition; each indicating a different and peculiar mode of cure. Thus, watching, flatulency, indigestion, rheumatism, or inflammation, may pro-

duce the head-ache; and sickness or vomiting may arise from surfeiting, from a load of mucus, or an influx of bile, or from an affection of the kidneys or bladder, and from other sources. In all these cases the empiric, or mere matter of fact physician, if he acts consistently with his professions, will attend only to the leading symptom, and will indiscriminately apply his stomachic cordials, or cephalic plaster, without any regard to the origin, nature, or proximate cause of the disorder. May we not, therefore, conclude, that mere experience, whether derived from books or acquired by observing the rise and progress of diseases and the effects of the remedies prescribed, is insufficient of itself to qualify us for judicious and successful practitioners; and that the theorist, or physician who is acquainted with the nature and proximate cause of diseases, has the same advantage that the empirical practitioner can boast of, from reading, observation, and practice; with the additional advantage, of knowing on what circumstances the disorder and its symptoms depend.

Notwithstanding the necessary conclusion from these facts, and although deductions from unequivocal facts and self-evident propositions are the only certain method of improving any art or science, and though Reason is the most exalted faculty of man, and the source of that high rank which he holds above all other animals of the terrestrial globe, there are a set of grovelling spirits who vilify the powers of the understanding, and with a sagacity adequate to the rank of beings to which, by their rejection of the aid of reason, they degrade themselves, pronounce all theory or reasoning on the nature and causes of diseases, and the *modus operandi* of medicines, useless and unavailing.

The reader will perceive by the following abstract of the theories of fever which have been taught at different times, that no theory of fever that has hitherto been proposed, is true, or in all respects perfect, though some of the more modern ones approach near to perfection. The failure in this instance appears to be owing to the unaccountable inattention to the rules of inductive philosophy,

by which Newton discovered the laws of the planetary system, and to the misapplication of the erroneous philosophy of former times, and to the unfortunate circumstance of physicians of eminence in their profession mistaking effects for causes, assuming imaginary for the real laws of the animal economy, and to their not being acquainted till very lately with the want of connection between the heart and brain, and with the important effects produced on the condition and properties of the blood by the atmospheric air through the medium of the lungs. The author therefore hopes that the observations contained in the following pages, will contribute towards leading the way to the establishment of a more improved theory, and consequently to a more rational and efficacious mode of practice in the different varieties of fever, than has heretofore obtained.

## SYNOPSIS, &c.

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**T**HE most ancient treatise of physic worthy of notice, that has escaped the ravages of time, and the more destructive hands of barbarians, was compiled between four and five hundred years before the æra of christianity, by Hippocrates, a native of the renowned republic of Greece, and a descendant of the once celebrated Esculapius, who it is said, performed such extraordinary and miraculous cures, that his countrymen paid him divine honours.

Before the time of Hippocrates, it appears from ancient history, that the healing art consisted of little else than the most absurd superstition and quackery, and that remedies composed of the most discordant materials, in conjunction with amulets, charms, and magic spells, or mysterious and magical and absurd ceremonies, were employed for the

cure of diseases, by artful, designing, and unprincipled impostors, who pretended “to hold converse with the airy tenants of the world unknown.”

According to the doctrine or theory of diseases contained in the works of Hippocrates, (whom posterity has honoured with the title of Father of Physic, and Prince of Physicians), the generality of diseases are occasioned either by a disproportion in the usual quantity or a depraved change in the quality of the phlegm and of the bile, or of either of these excreted humours mixing with the blood; and these, in conjunction with too great a proportion of atmospheric air contained in or introduced into the blood, is the cause of the cold fit which precedes a fever.

We may judge of the correctness of the pathology and the qualifications of this “Father of Physic,” for explaining the causes of the symptoms of diseases, from his explanation of the rigor and yawning which accompany the cold fit of an intermittent fever.

“The former (he says) is occasioned by air finding its way into the blood, by which it is refrigerated and condensed, in propor-



tion to the quantity and degree of coldness of the air which has gained admission into the blood; and a shaking or shivering takes place, because nature (which he says is some thing divine, that preserves order in the animal economy in health and restores regularity to it when disordered,) being *alarmed* by the sense of cold, causes the blood to take refuge towards the internal and warmer parts of the body. Its leapings and boundings make the whole body shake or tremble; the places which it has deserted shaking for want of it to keep them steady, and those to which it has run trembling from being over distended by its quantity, and the force of its influx.” “The yawning (he imagined,) was occasioned by the pent up air, rushing at once towards the mouth, and forcing it open, to find a passage out.”

Unluckily for the credit of this doctrine, it happens, that no experiments have discovered the existence of atmospheric air in the blood vessels; and in the act of yawning, the air passes in, instead of out of the mouth.

This doctrine of critical days, Celsus, who lived in the reign of Tiberius Cæsar, thinks he invented from a superstitious or implicit attachment to the doctrine of Pythagoras, relative to harmonic numbers.

Hippocrates who appears to have been the first founder or promulgator of the doctrine that morbid matter, generated in or introduced from abroad into the circulating fluids, was the immediate or proximate cause of all febrile diseases; presuming that what he calls nature never separates crude matter in the beginning of fevers, or while it is blended with good juices, he prescribed very few remedies, but waited to see what evacuations would make their appearance on the days that he supposed the disease would come to a crisis, (namely, on the 4th, 7th, 11th, 14th, 17th, and 21st,) but after removing the contents of the stomach and bowels, by a gentle emetic and cathartic, and prescribing rules for the regimen to be observed, which he directed to be of a mild and liquid kind, he trusted the management of the disease almost entirely to the economy of nature, and waited patiently for a crisis or change for

better or worse; as appears from his book  
 “*De diceta in morbis acutis.*”

The theory or medical philosophy of this eminent physician of the ancients, though its errors and fallacies are almost self-evident, became remarkably popular, and continued to bear sway among the most eminent of the Greek and Roman physicians for nearly three hundred years after the decease of its distinguished author, though its merits were called in question at different times within that period, by the chiefs of two sects or societies of physicians known by the names of dogmatists and methodists; and in the reign of Tiberius Cæsar, Themison, a distinguished physician of the methodic sect, ridiculed Hippocrates’s doctrine of critical days, and because he advised physicians to wait and observe the way that nature took to relieve the suffering constitution from the effects of fever, on certain days before they interfered with their remedies, which he supposed did more harm than good if administered before the morbid matter was concocted or ripened, so as to be fit to be separated and expel-

led; he called his practice "A meditation upon death."

The methodic sect, and Themison in particular, reprobated the tedious method of studying the symptoms of every individual disease, and the effects of every remedy which had been sanctioned by time and experience, and invented a more easy method of shortening the study of medicine. With this view, he divided all diseases into two distinct classes, according as the symptoms indicated too rigid and tense or too soft and relaxed a state of the solids, or an unequal combination of these two conditions.

In the early part of the second century of the christian æra, Galen, who has been much celebrated in medical history, and was at the head of his profession in the city of Rome, undertook to reform medicine, and restored dogmatism, (which had been superseded by the doctrine of the methodic sect,) though the doctrine of the dogmatists consisted of scarcely any thing but visionary hypotheses or fanciful conjectures, without reference to experiments or any alliance with the laws of the animal economy, and were involved in

an impenetrable labyrinth of error and confusion. He also wrote numerous commentaries on the aphorisms of Hippocrates, and composed several voluminous works of his own.

The theoretical opinions of Galen, in general, agree with those of Hippocrates, but he differs from him in extending the noxious qualities of the different humours, and in dividing the disordered pulse into minute and almost endless distinctions, which instead of instructing only serves to mislead and perplex the student.

He fancied that the reason why more or less feverish heat constantly succeeds an ague or chilly fit, is because, the blood after some agitation, brings to its own degree of heat the liquors or humours that have mixed themselves with it, and being thus increased in quantity must necessarily produce more heat in the body by the friction produced between the solids and the fluids." The phlegmatic and bilious portions of the fluids, rarified and attenuated by the feverish heat, in his opinion, separate themselves from the

mass, and are expelled on the critical days by the efforts of the animal economy."

Galen and his followers, as well as all the physicians of the ancients, appear to have believed that animal heat depended entirely upon the reciprocal friction of the solids and fluids, independent of any chemical change produced through the medium of respiration.

In conformity with his doctrine, the chief object of Galen and his followers was to prevent the heat from being increased by the friction, and the blood vessels from being ruptured by the rarification of the blood; for which reason their chief dependance was on copious blood-letting, and the liberal use of cold water inwardly. They also favoured such evacuations as occurred on the supposed critical days, but restrained them when they occurred on the intermediate days as an erroneous or mistaken propensity and effort of nature.

Galen supposed the lungs were intended for ventilators to the heart, that the animal heat might thereby be prevented from rising to excess. He imagined that air mixing with the blood generated the animal and vital

spirits. The chyle he supposed was conveyed from the stomach to the liver and there manufactured into blood by a species of fermentation not understood. But to the nerves he assigned their true function, as instruments of sense and motion. He was entirely ignorant of the laws and principles of chemistry, nor did he observe that close cautious method of investigating the causes of diseases or the effects of medicines which has since been recommended by Sir F. Bacon, from facts and experiments, but too often contented himself with substituting plausible but fallacious conjectures; hence, his pompous and chimerical doctrines have vanished before a more enlightened philosophy, "like the baseless fabric of a vision."

Notwithstanding the prolixity, incongruities, and inconsistencies of Galen's doctrine of diseases, it took the lead and kept dominion over all others, till the Roman empire was subverted by the Goths and Vandals in the 5th century, which event put almost an entire stop to the cultivation of literature of every description in Europe. From that time the study of the arts and sciences was entirely ne-



glected, and the only knowledge which had any relation to medicine that was cultivated, till after the revival of literature, which began to dawn in the 11th, but made little progress till after the invention of printing in the 15th century, was judicial astrology or the art of predicting future events by certain signs supposed to be legible in the stars. During that period, many physicians united with their profession the occupation of a sorcerer, conjurer, or fortune-teller, and pretending that they knew the nature of every disease from the mere inspection of the urine, without seeing the patient, and that they knew how to prescribe the most efficacious remedies from an examination of the signs of the zodiac, they took advantage of the credulity of the illiterate, and sported with the lives of their fellow creatures for the sake of a little filthy lucre, to enable them to live in idleness and ease; and by undetected or tolerated frauds frequently gained a *palace*, when their only title was a *gallows*.

During those dark ages of ignorance and credulity, the understandings of many ap-



pear to have been so much under the dominion of a misguided or deluded imagination, that they believed diseases of particular organs could be infallibly cured by particular vegetables, for no other reason than that there was a resemblance between the figure of the remedy and the diseased organ.

The physicians of those ages having acquired a superficial and incorrect knowledge of astronomy, supposed that every mortal was under the influence of the particular planet that was visible in the horizon at the time of his birth, and that his constitution and temperament partook of the qualities and temperament of that planet; of course, when disordered, medicines of a quality different from the temperament of such planet were to be employed. They also examined and consulted the different signs of the zodiac to know when it would be the most proper time to perform the common operations of surgery, to open a vein, pare a corn, or wean a child.

A remnant of the same absurd and ridiculous credulity, the offspring of ignorance and want of reflection, I am sorry to say, still continues to hold dominion over the minds of

the illiterate and vulgar part of the community in this as well as in other countries.

If any reliance can be placed on historical facts, the physicians of Europe became entirely ignorant of the nature and causes of diseases as well as of the laws of the animal economy after the subversion of the Roman government in Italy, till in consequence of the invention of printing in the 15th century, the remains of the literary and scientific treasures of ancient Greece and Rome became more generally diffused and sent abroad.

In consequence of these events, the works of Hippocrates and Galen again gained the ascendancy over the medical world, and their rules and precepts once more became the standard of legitimate practice. To these as to the oracles of reason, every one appealed, and these it was the study of every one to imitate.

But after the art of chemistry became cultivated, and medicines prepared by chemical processes were introduced into practice about the middle of the 16th century, by Paracelsus, who was born in Switzerland A. D. 1521, a few physicians of more cultivated

understandings, began to entertain doubts of of the infallibility of those authorities, as others did soon after of those who had assumed the privilege of regulating the faith of the christian world, and called in question the propriety of paying implicit homage to their precepts.

About the close of the sixteenth century, in the reign of Queen Elizabeth, arose that great luminary of science, Sir Francis Bacon, afterwards created Lord Verulam, who by means of experimental philosophy and inductive reasoning, invented or discovered the only method of acquiring certain knowledge in the arts and sciences.

While the other branches of science were daily improving, in consequence of the adoption of the plan proposed by the sagacious Bacon, Dr. W. Harvey, physician to King Charles the First, of England, followed the same plan in his anatomical researches, and rendered his name immortal by his discovery of the circulation of the blood. A discovery of infinite service to the art of surgery, in particular, and of very great importance to the healing art in general. 'The true knowledge

of the circulation had eluded the researches and dissections of all Dr. Harvey's predecessors, though Michael Servetus, a native of Geneva, who afterwards suffered martyrdom through the resentment and religious zeal of Calvin, on account of his religious opinions, appears from his account of the circulation of the blood through the lungs, published in the year 1533, to have made very near approaches to it.\*

In consequence of this discovery of Dr. Harvey, which was first made public in the year 1628, the doctrines of the ancients, and particularly that of Galen, which had been on the decline from the time that chemistry began to be cultivated, were renounced by the generality of physicians of that period, though too many, still governed by habit and the prejudices of an imperfect education, prostituted their reason to blind authority.

The knowledge of the circulation of the blood, however, did not for a considerable time, contribute to advance one of the essential objects of medicine, the knowledge of the

\* For an account of the opinions of Servetus, the reader is referred to Dr. Priestly's church history, vol. v. p. 454.

nature and proximate causes of diseases, so much as might have been expected, owing in a great measure, to physiologists and physicians adopting and applying the principles of mechanical philosophy to explain the motions and operations of the living body; for, it is a discovery of a more recent date, that the laws which govern passive and inanimate matter, are by no means similar to those which govern living bodies, and that maxims which are true and just when applied to insensible tubes and inanimate substances, are erroneous, and lead to false conclusions, when applied to those that are sensible or irritable, and are every instant changing their areas. The principal defect of the mechanical doctrine consists in overlooking the great influence of the vital principle in every part of the animal economy.

For a number of years after the discovery that the blood, passing from the heart was carried by the arteries to all parts of the living system, and that from thence it returned to the heart through the veins, the human body was considered as a hydraulic machine, the good state and preservation of which de-

depended on the liberty that the blood had to pass through all the tubes with which it is supplied. The principle of life and health being thus founded in error, the loss of the equilibrium between the solids and fluids and a disordered circulation were looked upon as the chief causes of diseases; the attention of physicians was therefore directed to the too lax or too rigid state of the fibres, and to the fluids being in too large or too small a quantity for the capacity of the vessels. In a word, the physicians of that period considered the living body to be a mere *hydraulic* machine, provided with mechanical instruments, including pulleys, levers, pumps, suckers, bellows, strainers, &c.; and they imagined that the fluids of the human body ascended and descended by the power of gravitation, as well as by a vis a tergo and contractile power of the heart and arteries. They were acquainted with no arguments but numbers, and with ~~no~~ proofs but algebraical calculations. Thus, by applying the laws of mechanics to explain the motions and operations of the animal economy, the discovery of the circulation for a time, in-

stead of leading to correct views, became the source of dangerous errors in the theory and treatment of diseases.

This, among others, is a strong evidence of the injurious practice which must necessarily be the consequence of adopting an erroneous theory, and of the great importance of acquiring a competent knowledge of the nature and proximate causes of different diseases.

Other professors, about the same time, joining chemistry to mechanics, taught among other errors, that all fevers were occasioned by certain minute substances with rough or angulated surfaces or sharp points, in the shape of triangles, introduced into or generated in the blood, in consequence of the operation of certain remote causes suppressing or obstructing some of the natural and customary secretions, or occasioning a retention of the substances which ought to be secreted, and that the fulness, heat, or acrimony, jointly or severally, proved direct stimulants to the heart in the course of the circulation; and for the cure of the diseases, they prescribed such medicines as they fancied were



adapted to soften, obtund, and render these little wedges and sharp pointed substances soft and globular, and thus fit them to be expelled from the circulating mass by what they called an effort of nature.

For some time after the introduction of medicines prepared in the laboratory of the chemists, which were brought into practice by the enthusiastic Paracelsus, about the year 1547, who appears to have been fanciful and enthusiastic in his theories, bold in his practice, and rashly confident in his means: the professors, who, agreeably to the fashion of the day, devoted much of their time to the study of chemistry, to the exclusion of the other branches of medical knowledge; and particularly, after the improvements made by the noted Vanhelmont, several years later, came to be publicly known, appear to have been so much under the influence of a chemical mania as to consider the human body similar to an alembic; and fancying febrile diseases to be owing to an excess of fermentation, among the particles of which the fluids of the human body are composed, they had recourse to such remedies as they had observed



to have the effect of subliming or precipitating portions of different compositions in their retorts; and mistaking the coagulable lymph or gelatinous substance which covers the crassamentum of the blood in diseases depending on inflammatory affections, for crude and indigested morbid matter, they took great pains to prevent the febrile heat from being reduced so low as the usual temperature in health, lest its fermentation and maturation should be prevented or retarded.

Riverius, physician to King Henry the Fourth of France, and cotemporary with Sir Theodore Mayerne, who was afterwards physician to King Charles the First of England, was so much influenced by the hypothesis or false philosophy of the time in which he lived, that in cases of small pox, he advised the air to be excluded from the chamber of the patients, and their beds to be covered with red cloth, "because that colour by some affinity with the red and boiling blood, attracts it to the external parts." He says "it is also customary to keep a sheep in the chamber, or on the bed near the patient, because these creatures are easily

infected, and draw the venom to themselves, by which means relief is given to the sick."

The prescriptions of both the physicians above mentioned, in general, contain such a number of heterogeneous and discordant materials, that they have more resemblance to the compositions of the witches in *Macbeth* than to the prescriptions of rational and regularly bred physicians.

Such was the astonishing credulity in those times, even of men who devoted much of their time to the arts and sciences, and such has ever been the rage for the marvelous with the illiterate, that a belief was prevalent that the mere application of the hand of a king or queen (to which superstition had assigned divine power,) to scrofulous tumours, would effectually disperse them; and that touching warts, corns, and other excrescencies with a dead man's hand, or a piece of the flesh of an animal recently killed, and afterwards buried, would produce a similar effect. This was supposed to be owing to some sympathizing or subtle occult connecting principle, existing between the decaying substance and those excres-

cencies with which it had been in contact,—in consequence as the one decayed the other followed its example.

A remnant of the same credulity, superstition, and propensity to the marvellous still continues to exist at the time of my writing this; especially among those whose minds have not been enlightened by scientific culture, of which we have had recent examples in Mesmer's Animal Magnetism, and Perkins's Metallic Tractors.\*

Some of the professors of that age, and among others, Doctor Thomas Willis, contemporary with Sydenham, and a professor of considerable celebrity in the university of Oxford, where students are still taught "by rule to stray," (an English translation of whose works were published in the year 1684,) was of opinion that febrile heat was occasioned by a collision of nitre (which he

\* In May 1682, notice was given in a London Gazette, that as the weather was growing warm, his Majesty would not touch any more for the king's evil, till after Michaelmas; and in 1687, an indigent citizen of New Hampshire, having tried every other means without effect, petitioned the Legislature for aid to transport him to England for that *efficacious* remedy. *Massachusetts Medical Communications*, vol. ii.

supposed was contained in and separated from the atmosphere by the lungs,) and sulphur, which he supposed was one of the elements or constituent principles of blood.

The sagacious and highly celebrated Dr. Thomas Sydenham, who published his observations on diseases in the year 1685, which are chiefly valuable on account of the accurate description which he has given of the symptoms of those diseases that occurred in his own practice, influenced by the opinion of the ancients, and particularly by that of Hippocrates, though he disclaims all instruction or assistance from the works of others, adopted the doctrine, that morbid matter is the immediate or proximate cause of every form of fever unconnected with local inflammation. The remote or generating causes he supposed were indigestible or unwholesome food, impure water, the suppression of perspiration from cold and moist air, and the subsequent operation of unusual heat, and particularly, some supposed, (for he has offered nothing in proof of his opinion) mysterious and occult change in the constitution of the atmosphere, by some inexplicable ope-

ration of certain planets, comets, or the eruption of volcanoes, &c.

According to his theory, when any foreign and noxious matter was introduced into or was generated in the blood, for want of regularity in the secreting vessels and the excretory ducts, it occasioned a fermentation similar to that of vegetable juices in the formation of vinous liquors. The preternatural heat he attributed to an effort of nature, or a salutary operation of the animal economy, to ripen and prepare the morbid matter, so as to fit it for separation and expulsion from the circulating fluids.

The opinion of this worthy but mistaken physician, relative to confining the use of purgatives and diaphoretics to the critical days of Hippocrates, and of restricting bleeding in pleurisies and other fevers depending on local inflammation, to the first week of the disease, and with respect to the length of time that the crude morbid matter requires to become ripe and fit for expulsion, and relative to intermitting fevers generally ceasing spontaneously, without the aid of art, after the fourteenth paroxysm, must appear ex-

tremely fanciful and objectionable to every one acquainted with the more recent improvements in meteorology, and the effects of season, climate, soil, and other local circumstances; as well as his doctrine relative to certain noxious changes in the constitution of the atmosphere being necessary for the propagation and spreading of contagious diseases, as well as of those which depend on season, soil, or local circumstances,—such as intermittent fevers, and dysenteries, during the continuance of which insalubrious change in the constitution of the atmosphere, they would prevail and spread, independent, or without the aid of season, situation, temperature, or other sensible qualities of the air; which insalubrious change in the constitution of the air, he ascribed to eruptions, and noxious exhalations from the bowels of the earth, or to the baleful influence of the planets.

The seasons at London have undergone little or no change for many ages, as has been proved from the testimony of medical writers of the seventeenth century, especially of the elegant Claromontius. The same vi-

cissitudes of temperature, and the same severity of the vernal months, were then as much the topics of complaint as they are at present. Yet we now find that the order of the seasons, in respect to the production of diseases is nearly reversed, in consequence of the improvements which have been made in the structure of the houses, the arrangements of the streets, and in the police of London, although the character of the seasons continue the same. Formerly, it was "*saluberrium ver; autumnus longe periculosissimus* ; but now it is the reverse. The inference from these data, is obvious, by this; that the constitution of the atmosphere, as to heat and cold, dryness and moisture, which the changes of season occasion, is not the source of epidemic diseases; and that the alteration in the condition of the air, which formerly rendered it the pregnant cause of disease and death, especially in the autumnal months, was not any occult intestine changes in the constitution; not any general contamination brought from afar; not any change from the attraction or repulsion of hostile planets, or noxious impregnations from the eruptions

and exhalations of distant volcanoes; but an impregnation received upon the spot,—a noxious exhalation which that portion of the superincumbent air imbibed from the soil, and the impurities of animal and vegetable substances left upon its surface to putrefy, and to the impurities secreted and excreted from living bodies, suffered to accumulate in unventilated situations.” See Annual Med. Review and Register for the year 1809.

After the publication of the medical works of Sydenham, and the observations and opinions of Baglivi, professor of anatomy and physic at Rome, in the year 1696, a humoral, in conjunction with a chemical pathology, continued to be the most prevalent doctrine till about the beginning of the eighteenth century, when Dr. Stahl, professor of the practice of physic in the university of Halle, in Germany, introduced a doctrine of a very different character from any that had preceded that period.

According to the system of this professor “the motions and functions of the human body are governed entirely by the rational soul, to many of the motions of which it is



not conscious, owing (as Dr. Stahl supposed) to a habit of action, and not to the physical mechanism and irritability of the living solids. The soul being extended through the medium of the nerves to all parts of the body, perceives every noxious impression or disorder that occurs in the system, and like a faithful guardian calls such powers of the system into action, as are qualified to remove or obviate the noxious impressions, and to preserve its salutary operations."

This fanciful system was not only adopted by the whimsical and unreflecting members of the profession, as is usually the case with every thing that is novel and mysterious, however absurd and unintelligible it may be, but, in part, by several physicians, distinguished for their erudition, in France and Great Britain, as well as in Germany; though the mathematical system of pathology, as explained by Bellini, was supported by Simpson, Perrault, Nichols, and many others.

Junker defended the system of Stahl, and some traits which favour the same doctrine, may be seen in the works of the late learned Gaubius of Holland.

This metaphysical system, however, which favoured an inert practice, and taught to commit the cure of all diseases to the care and management of the soul, soon fell into discredit with most of the practical physicians, and only continued to maintain its reputation with a few superficial enthusiasts and inexperienced theorists.

The next system of any note that attracted the attention and admiration of the medical world, was that of Dr. Frederick Hoffman, professor of physic in the same university as Dr. Stahl.

The theory of this distinguished professor was erected on a very different foundation from those of any of his predecessors. From this system, it appears that Dr. Hoffman was the first who discovered, that the generality of diseases, and that fevers particularly, have their seat in the solids, instead of the fluids of the human body, though according to Dr. Ferriar the opinion had been suggested somewhat earlier by Dr. Piens. Professor Hoffman, however, still admitted the agency of a depraved state of the fluids; and even supposed them to be in a state of putrefaction in

some instances. By blending and retaining too much of the mechanical cartesian and chemical rules of explanation in his system, and allowing them to influence his reasoning and his practice, he has disfigured and rendered it confused and untenable.

The learned and experienced author, notwithstanding the liberality of his education and the extensiveness of his acquirements, appears to have retained too much of the early impressions of the nursery, and to have suffered himself to be too much influenced by superstitious and vulgar opinions, as is evident from a chapter in his works on diseases occasioned by Witchcraft, or the operation of supernatural agents, for the removal of which he has given very grave and circumstantial directions. The opinion of supernatural agency in the production of certain diseases, and of those of the convulsive kind in particular, was in former ages very universal—the invention of imposters, or the suggestions of a disordered and deluded imagination; but the error having since been discovered, in consequence of more accurate enquiries and a more improved state of philo-

sophy, it is at present deservedly ridiculed as the phantom of a weak and disordered mind, or as the base and execrable invention of artful and designing imposters and mountebanks to deceive and mislead the ignorant and credulous populace.

Hoffman, however, was the first that publicly dissented from, and exposed the errors of the humoral pathology, or the long established doctrine of morbid matter, being the proximate cause of fever; and expressly taught that fevers depend upon diminished power in the nervous system, and of course, led the way to a more correct and rational theory, or one more compatible with observation than any that had been attempted before his time.

In his opinion, "all diseases are attended with irregularity of action, or a suspension of all action; and when this irregularity of action is too violent, either spasm or convulsion is the consequence, and when weaker than natural, atony or weakened contraction of the muscular fibres, is the effect." He also taught that the treatment of diseases was to be improved, not so much by expe-

rience, as by the skilful application of mechanical principles, and by the sedulous study of their nature and proximate causes. According to his theory, the proximate cause of every form of fever is a spasm or constriction of the capillary or minute arteries, at the surface of the body, both internal and external; in consequence of which, he supposed the blood was repelled and conveyed in an unusual quantity to the heart, and that it was thereby distended, and excited to more frequent action, till it overcame the resisting and irritating cause. He also attempted to account for the symptoms of inflammation on the same principles. Owing, however, to the circumstances already mentioned, he does not appear to have applied his theory in the treatment of diseases with that judgment and effect, for which, if it had been perfectly correct, it was adapted.

Before the system of Hoffman became generally known, its lustre was not only eclipsed, but it was almost entirely superseded for a considerable length of time, by the more captivating, and, on a superficial view, the more plausible system of the celebrated

Boerhaave of Leyden, which was afterwards extended and explained in eighteen octavo volumes, by the Baron Vanswieten, physician in chief to the Empress of Germany.

The following is the substance of the remarks of Dr. Cullen on the Doctrine of the last mentioned learned and distinguished professor, viz. "What Dr. Boerhaave has offered on the diseases of the simple solid, has the appearance of being very clear and consistent, and was certainly considered by him as a fundamental doctrine; but in my opinion, it is neither correct, nor extensively applicable. Not to mention the useless and perhaps erroneous notion of the composition of earth and gluten, his mistake respecting the structure of compound membranes, or his inattention to the state of the cellular texture, all of which render his doctrine imperfect,—I shall insist that his doctrine is very little applicable towards explaining the phenomena of health and disease. The state of the simple solid is upon few occasions either changed or changeable, but the phenomena attributed to that change, do truly depend on the state of the nervous and mus-

cular solids, as has been satisfactorily proved by the experiments and observations of Baron Haller. How much this shews the deficiency and imperfection of this system requires no explanation."

"Having considered the diseases of the solids, Professor Boerhaave proceeds to explain the more simple diseases of the fluids."

I need not give a circumstantial detail of the well known facts and arguments which have been published by Dr. Cullen and others to prove the error of the Boerhaavian doctrine, which assigns a morbid state of the circulating fluids, as the proximate cause of febrile diseases, or to prove the gross error of the humoral pathology, or of inflammation depending upon the escape of globules of blood, and getting as it were by mistake into vessels of a different order, whose diameters are too narrow to allow them a free passage.

The experiments of the late ingenious Mr. Hewson of London, father of the worthy and much respected Dr. Thomas T. Hewson of Philadelphia, furnish the most convincing proofs that no such lentor or viscosity is contained in the blood as described by Boer-



haave in cases of fever depending on inflammation of any particular viscus, but on the contrary, the blood is in a state of greater tenuity and fluidity, and the size or gelatinous substance which is observed to cover the crassamentum of blood drawn in such cases, after it has remained in a bowl till cool, is only the natural coagulable lymph, which being specifically lighter than the red globules, and separated from the rest of the mass by the strong and repeated contraction of the heart and arteries, and the slower coagulation of the blood in such cases, rises to the surface unmixed with the red globules.

Sauvages, Vogel, Gaubius, and other systematic writers have attempted, in their systems of nosology or methodical arrangement of diseases, to unite the doctrines of Hoffman and Boerhaave, in their explanations of the proximate causes of diseases, and have been followed by the late Dr. David M'Bride of Dublin, in his "*Introduction to the Theory and Practice of Medicine*," and by Dr. John Baptist Burserius De Kanifeld, professor of physic at Milan in Italy, the last men-



tioned of whom, published his "*Institutions of the practice of Medicine*" three or four years after the publication of Dr. Cullen's "*First Lines*."

The doctrine of Professor Boerhaave had gained such dominion over the understandings of the generality of physicians in Europe, and particularly in Great Britain, before the time of Dr. Cullen, that not only the experienced Huxham, but even Dr. Mead, the most accomplished scholar of the last age, so late as the year 1750, was so convinced of the truth of this doctrine, and his judgment was so much perverted by its plausibility, that he fancied, in a case in which the patient speedily recovered after the application of the lungs of a lamb to his head, that the morbid matter issued through the pores of the skin from the part where the lungs were applied.\*

Doctor Tode, a professor in the university of Copenhagen, the capital of Denmark, who published his opinion in the year 1769, eight years before the publication of Dr. Cullen's *First Lines*, considers the proximate

\* See Mead's Medical Works published in 1767.

cause of fever to be an increased action or exertion of the sensorium, communicated in different ways to all the other parts of the body, and says “the difference in the phenomena or symptoms of fevers, depends upon the greater or less power of the sensorium, or on its greater or less sensibility or susceptibility to the impression of irritating or stimulating agents; the symptoms in the former case being inflammatory, in the latter, nervous or accompanied with symptoms of defective power in the sensorium, and the organs dependent on its influence.”

As the accession or cold stage of fever cannot be explained or accounted for on this doctrine, or on the one lately published by Dr. Clutterbuck, who refers all the phenomena of fever to a manifest or latent inflammation of the brain, it would be time misemployed to take any notice of them. The perusal of Dr. Cullen’s remarks on the different theories of proximate causes, which had existed before the publication of his works, will satisfy the reader, that all such doctrines as refer the proximate cause of febrile diseases to direct stimuli alone, are erroneous.

The following are a few of the numerous instances of the deplorable effects of the practice to which all the theories of fever led, which prevailed at different periods, previous to the publications of Hoffman and the lectures of Dr. Cullen.

Dr. Silvius having been misled by the doctrine that the coagulation of the blood is the proximate cause of fever, banished bleeding and cooling remedies from the cure of fevers, and recommended spirituous and volatile substances to dissolve the supposed coagulation. Dr. Gilchrist and other physicians of Great Britain, employed mercury for the same purpose, though its invariable effect is to produce the very circumstance which they employed it to remove. They appear to have fallen into this pernicious error, in consequence of a hypothesis engendered in their own minds, from neglecting to ascertain the existence of the fact before they drew their conclusions.

Sydenham, Baglivi, Boerhaave, and Mead, with a numerous host of servile followers, considered a fever not as a disease, but as the remedy of a disease, called up by nature

almost exclusively for the purpose of throwing out peccant or morbid matter, blended with the circulating fluids. For this reason, their chief aim was to regulate the heat, and the excessive or defective motion of the blood, till the morbid matter had time to ripen and become fit for expulsion. For the same reason they were very reserved in the use of the lancet after the first two or three days, even in cases of pleurisy, excepting when the blood was covered, after standing to cool, with a thick sizey surface, by which they were principally guided in the repetition of bleeding, from mistaking an effect for a cause, instead of by the greater or less strength of the heart and arteries as indicated by the pulse, heat of the skin, &c. They also prohibited purgatives in the early stage of all fevers, as well as all other depleting remedies, excepting a mild emetic and purgative at the commencement of the disease, to carry off the contents of the primæ viæ, from a belief derived from their theory that they would prevent or retard the concoction or ripening of the morbid matter; and in cases of inflammation, that they would

only evacuate the thinner or watery portion of the blood, and leave the remainder thicker.

Henry Sereta, reviving the opinion of Diocles, derives all fevers from an inflammation of the viscera, and from a supposition that inflammation is owing to an obstruction of the blood in the small vessels, from its too great viscosity, by which it is hindered from passing through them; he condemns bleeding, purging, and all remedies that diminish the febrile heat, as well as those that carry off the thinner parts of the blood, lest it should leave the remainder thicker and more glutinous, but proposes to cure them by spirituous volatile alkaline and saponaceous remedies, by which means he expected to dissolve and discuss the thick obstructing portion of the blood, which only existed in his own bewildered imagination.

Some of the over wise gentlemen of the faculty, adopting the cartesian philosophy, imagined that fevers were occasioned by an obstruction of the blood itself, and not of the blood vessels, in consequence of which, the subtile or spirituous matter, which they sup-

posed, was constantly ranging through the blood with great celerity, and passed through its pores in straight lines, excited a violent commotion in it, in order to recover its customary course.

Consistently with this *hopeful* theory, their chief remedies consisted in the liberal use of warm water to dilute and dissolve the obstructing glutinous matter with which they imagined the pores of the blood was plugged up.

Others imagined that all idiopathic fevers were the effect of more or less putrefaction of the circulating fluids, and being misled from observing that the putrefaction of dead animal substances is increased by moisture, forbid their patients from drinking water, either cold or warm, for the first three days, lest it should increase the supposed cause of the disease. By this preposterous treatment "the patients frequently suffered more by the doctor than by the disease."

If Mr. Malthus, the author of several ingenious tracts on political economy, had been acquainted with the hopeful doctrines and random practice of physicians, general-

ly, from the time of the conquest of the Roman empire in the sixth to the close of the seventeenth century, I fancy he would not have considered the introduction of the small pox into Europe, war, famine, pestilence, and typhus fever, as the only instruments in the appointments of Providence for preventing the population of the world from becoming too great for the means of subsistence.

When Dr. Cullen had exposed the errors and defects of the Boerhaavian doctrine of diseases, and had shewn that the ancient and venerable doctrine of morbid matter, which originated with, or was adopted by Hippocrates, and which, like a solid body falling from a great height, seemed to acquire additional force as it descended through admiring ages, was merely hypothetical or conjectural, and had resulted from mistaken facts, and imperfect observations; and that as it had no alliance with nature or truth, it had a tendency to lead to wrong and dangerous practice, he found it incumbent upon him to compose a new system to supply the place of those which he had exposed and demolished, for the instruction, as well as *enter-*



*tainment*, of the great number of medical students that attended his lectures in the university of Edinburgh, where he was appointed to the professorship of the theory and practice of physic.

Such a system he accordingly composed, and afterwards published in the year 1777, under the title of “*The First Lines of the Practice of Physic.*” The substance of his doctrine I shall now proceed to examine.

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*Observations on the doctrine of the ingenious and celebrated DR. WM. CULLEN, Professor, &c.*

Doctor Cullen improving on the hints and opinions of Hoffman, reasonably concluded that we are to look for the origin and seat of diseases, not in the ideal habitations of humours and animal spirits, not in the chemical changes or fermentations of the blood, but in the solids of the human system, and that the true knowledge of the nature and proximate cause of diseases, must be de-



rived from a knowledge of the causes of the motions and functions of the human body in a state of health, and of the causes of the deviation or disorder of these motions and functions, when disease exists; and his observing and penetrating mind was soon convinced, that the generality of diseases depend upon the morbid state of the nervous and muscular portions of the solids, and that the disordered condition of the fluids in the generality of the fevers that occur, is the effect of too strong or of too weak action of the heart and arteries on the blood, and seldom, if ever, the effect of morbid matter introduced into it, excepting when occasioned by certain specific contagions, which operate not only in producing too high or too low excitement of the sensorium and nerves, but in impairing the vital principle, or principle of excitability in every other part of the system; and especially, as observed by Dr. Milman, in the muscular fibres of the heart and arteries.

Thus we perceive that the fundamental part of this doctrine is, in many respects,

different from all that preceded it, with the exception of that taught by Dr. Hoffman.

Dr. Cullen's systematic arrangement of diseases into classes, orders, genera, species, and varieties, is perhaps too artificial and complicated, and not so useful as if he had divided all idiopathic, i. e. all diseases in which the whole system is more or less disordered, only into genera and species, or into species and varieties.\*

His histories of diseases are inimitably explicit and correct. He even excels the acute and celebrated Sydenham, in his description of the diagnostics, or those symptoms by which each form or variety of disease is distinguished from every other.

The accuracy and comprehensiveness of his definitions are peculiar to himself and stand unrivalled on the records of medicine. The generality of his *practical* rules are selected from his own extensive experience,

Dr. Thomas Young, physician to St. George's hospital, has lately published an improved system of nosology, in which he has not only rejected the most exceptionable parts of Dr. Cullen's nosology, but has added Dr. Willan's valuable nosology of the diseases of the skin.

and the experience of the most judicious and successful of his cotemporaries, and will remain an invaluable treasure to the medical profession through successive ages.

Even the theoretical part of Dr. Cullen's system, though by no means faultless or free from imperfections, must be considered as a prodigy of ingenuity, when the difficulties which he had to encounter are taken into consideration.

Truth, however, constrains me to acknowledge, that notwithstanding the judicious plan which Dr. Cullen adopted and improved, for investigating the proximate causes of diseases, or that condition of the living system on which the symptoms of disease depend, by collecting and tracing effects to their causes, he has fallen into several mistakes; and in some instances, in my opinion, very considerable ones.

Some of these I shall now proceed to enumerate, that they may serve as beacons, to guard others from falling into the same error.

The first error that occurs in Dr. Cullen's arrangement of diseases is, I conceive, that

of classing them according to their symptoms, instead of according to the similarity of their nature and proximate cause. For, it is well known, that diseases the most dissimilar to each other in their nature and proximate causes, have similar symptoms. The intermittent fever and the typhus, the proximate cause of the former of which appears, from the symptoms and the effects of the occasional cause, to be a certain degree of debility or impaired energy of the nervous, and preternatural irritability of the arterial system; and in the latter, an impaired state of the muscular fibres of the heart and arteries, in conjunction with nervous debility, he has placed in the same order and genus with fevers accompanied with, and dependent chiefly on, a local inflammation of one or more of the viscera.

The *cyanche maligna*, or putrid and ulcerous sore throat, he has placed in the same class with the highest of all inflammatory affections, the phrenitis, pneumonia, carditis, enterites, &c.

The small pox and measles, which are generally attended with strong action and in-

inflammatory symptoms, during the eruptive fever, are placed in the same order as the pestilence, the most debilitating and malignant of all diseases; because the latter is attended with glandular swellings and carbuncles, or gangrenous eruptions. The *cyanche tonsillaris* he has classed with the *cyanche maligna*, because the tonsils and fauces in both, are affected with swelling and inflammation, though proceeding from different causes, and entirely differing in their nature, and requiring remedies of a different kind.

He has also committed an inconsistency in arranging pyrosis, diarrhœa, and diabetes in the same order (*viz.* spasmi) with pertussis, cholera, asthma, and hydrophobia; and in the same class (neuroses) apoplexy, and hypochondriasis; while menorrhagia, hæmatemesis, and hæmorrhoids are arranged in the same order with typhus, pneumonia, and dysentery.

These instances are sufficient to shew, that attention to symptoms alone, without a competent knowledge of the nature and immediate cause of each individual disease, is insufficient, and often tends to lead to false

associations, and consequently, to erroneous and hazardous practice; whereas, an arrangement according to the nature and proximate causes of diseases, where these can be discovered with certainty, is not liable to such error and confusion; and it ought to be the object of classification to render the acquisition of knowledge certain, easy, and of practical utility.

Doctor Cullen has also incorporated with his system, two opinions, one of antiquity, the other of more modern date, both of which, in my opinion, disfigure its harmony and simplicity, viz. the doctrine of critical days in continued fever, and that of the *vis medicatrix naturæ*, or what he calls a law of the animal economy, whereby motions are excited to resist and remove noxious or injurious impressions; both of which have been combatted, though not with becoming temper, nor in the mild spirit of philosophy, by the late Dr. J. Brown, of Edinburgh, and more recently, with the becoming spirit of a candid and sincere inquirer after truth, by Mr. John Burns, of Glasgow, in the first volume of his dissertations on inflammation.

According to the Cullenian doctrine, as observed by Mr. Burns, "fever is not produced directly, by the application of hurtful agents, but by the supposed interference of the vis medicatrix, or healing power of nature."

That Dr. Cullen has been led into mistakes by the abstract consideration of symptoms, appears to me evident, from the proximate cause he has assigned to every variety of fever and inflammation; and from his placing fevers depending on local inflammation, in the same class and order with those that are idiopathic, and that originate from, and depend upon, a different cause.

The evidences which he adduces in support of his opinion are, that in both the idiopathic or simple fever, and fever depending on inflammation existing to a certain extent, in some part of the system, there is a dry hot skin, thirst, and a decrease of the several excretions.

These symptoms, however, in case of fever accompanied with, and depending on local inflammation, cannot depend on spasm, which unquestionably requires a part to be in a state of debility, in conjunction with



preternatural excitability of the vessels or fibres of the part affected, or acted upon, by stimuli disproportioned to the morbid state of excitability, but upon preternatural fullness and distension, and increased action of the arteries of the affected part, and consequent pain and irritation, &c. ; for “the general operation of all powers productive of inflammatory diathesis, proceeds upon principles that would remove the atony or defect of power subsisting in the extreme vessels, which Dr. Cullen considers as the immediate cause of spasm in cases of fever ; whereas, the remedies employed to remove the arterial tension and inflammation, would necessarily increase and fix a spasm.”

If the remote causes of fever “produce a sedative or debilitating effect, (as taught by Dr. Cullen,) upon the nervous system,” this state of debility, in connection with the usual excitability which exists in the arterial system at the same time, is sufficient to account for all the appearances of spasm on the extreme vessels, at the commencement, and during the course of a simple intermittent fever.



The arteries, which are composed of cartilage and muscular fibres, have been discovered to possess a considerable portion of irritability or excitability, but not of sensibility.

When the propulsive power of the heart and arteries is so much diminished, in consequence of the diminished energy of the brain, (from whatever cause such an effect is produced,) that they cannot propel the blood with sufficient force into the extreme vessels, those vessels must necessarily contract, or become diminished in their diameters, and shortened in their dimensions, because of their muscular structure, and elastic property. But in such a debilitated state of the heart and large arteries, those extreme vessels must also be affected with a corresponding state of debility, though their irritability remains unimpaired, or may be, perhaps, preternaturally increased. Hence, it is not probable that they can give preternatural resistance to the heart and large arteries, and thereby be the indirect cause of the hot stage of the paroxysm in intermittents, or the protraction of the febrile paroxysm

in fevers of a continued form; both of which, if that were the case, would readily yield, as soon as the activity of the heart and large arteries was restored, by the employment of strong and diffusible stimulants.

According to the opinion of Dr. Cullen, every variety of idiopathic fever depends for its existence, and continuance, on an impaired state of the energy of the brain, and a consequent spasm of the extreme vessels. That this theory, Dr. James Hamilton, jun. says, is inadequate to the explanation of the phenomena of typhus or continued fever, is presumed from the following circumstances.

“1st. Continued fevers are not always preceded by a cold fit, nor by other symptoms denoting spasm of the extreme vessels; and

“2dly. The energy of the brain is not always restored on the cessation of the fever, for imbecility of mind is the frequent consequence of that disease. These objections to the spasmodic doctrine of fever are selected as being incontrovertible. Others, founded on the inconsistency of the several parts or

principles which constitute the theory, might be urged."

How the debility of the functions of the brain or nervous system, according to Dr. Cullen's theory, proves an indirect stimulus to the sanguiferous system; how this debility acts in producing the cold stage and spasm of the extreme vessels; how through the intervention of the debility and spasm of the extreme vessels, the action of the heart and large arteries is increased; how the energy of the brain is restored, and how this energy is extended to the extreme vessels, is not explained by Dr. Cullen. Whatever rests on these points, therefore, is confessedly hypothetical, or conjectural and uncertain: and if what rests on these is excluded from his theory, all that remains, as is observed by Dr. A. P. Wilson, of Edinburgh, will be found nothing more than a short recapitulation of the symptoms of fever.

Many other facts and arguments might be offered to prove that a spasm of the extreme vessels is not a part of the proximate cause of any variety of fever, but is merely a symptom

proceeding from an impaired energy of the sensorium, and a diminished action of the heart and arteries, the effect of the debilitating power of the remote causes; but, in my opinion, what has been already suggested is *amply sufficient for that purpose*.

I shall, therefore, conclude my observations on Dr. Cullen's theory with the repetition of an old adage, viz. "*Errare est humanum*;" for, though his doctrine is not perfect nor free from error, it is the best that the state of medical knowledge, at the time he wrote, was calculated to admit; and it is honourable even to fail in a laudable attempt.

It appears, from a variety of passages in the works of the late SIR JOHN HUNTER, the celebrated anatomist and physiologist, that he considered every operation or motion of the human body, as an action of the vital principle, and that "this principle is, as it were, diffused through the blood, as well as through every solid fibre of the body, making a necessary constituent part thereof, and forming with them a perfect whole; giving to both the power of preservation, the susceptibility

of impression, and from their construction, reciprocal actions, and reactions." "It was also his opinion that diseases are propagated from a part, to the whole system, by means of the diffused vitality."

This author, who adopted the opinion of Harvey and Willis, that the blood is alive, founded his opinion upon the observation of certain phenomena, and, especially, on the coagulation of the blood. "This living principle he supposes to be the same with that of the rest of the body, and that something similar to the brain is distributed through the blood, which he calls the diffused matter of life."

It is probable this doctrine led the way to the doctrine subsequently taught by the noted **DR. JOHN BROWN**, of Edinburgh, of which the following is an abstract.

"Our system of solids (says Dr. Brown) is a form of living matter, whose characteristics are sensation and motion."

"The susceptibility of external powers is excitability: the agents, stimuli or exciting powers: The result, excitement." "Without this property, our bodies would be dead

and inert matter;—by this property, they become living matter—by this property, called into action by the exciting powers, they become living systems.” “While the stimuli act on the excitability with a sufficient degree of power, then is the pleasant sensation of health: when they raise the excitement above this point, or depress it below it, there is disease. When the stimuli cease to produce excitement, or the system to feel their power, there is death.”

“Excitability is a property or energy of living matter, peculiar and inherent; but it is a property which cannot be subjected to the cognizance of our senses, and it is to be referred to a point of fact. Of this energy, property, or principle, there is assigned a certain portion at the commencement of life;—but this quantity differs in each individual, and is found to change in the same subject, at different periods of life, and in different situations or circumstances; being, on the one hand, occasionally accumulated, abundant, or superfluous, and on the other, exhausted, deficient, impaired, or nearly extinguished.”

“The stimuli or exciting powers are heat, light, sound, air, and motion; the ingesta, the blood, the secretions, muscular contraction—and finally, the powers of the mind; as perception, passion, and thought.

“Excitement is life; the natural movements of the machine, and the functions resulting from these, are sensation, reflection, and voluntary motion; which, as they immediately flow from the exciting powers, are *vigorous* when these are *strong*; *languid* when these are *weak*, and *cease* when they are *taken away* entirely.”

Thus we are taught that the actions or motions of our bodies are caused by external agents, and that “*life is a forced state*,” that our weak frame has an unceasing tendency to dissolution, which is opposed only by the incessant application of exciting powers.—That “these powers are the support of life, and that being partially or completely withdrawn, are immediately followed by disease or death.

“For the better understanding this doctrine, it is necessary to explain this principle, viz. “That all stimuli in acting on ex-



citability, exhaust it; thus, the stimuli of aliment, air, motion, passion, thought, have supported the body through the labours of the day; they have supported the functions by acting on the excitability;—in the evening it is exhausted (or the whole system is weakened) by the excitability being diminished by their continued operation.—They no longer produce the same effect; the functions fail; we sink into rest, and continue in sleep almost an equal time, unaffected by stimuli; renewing, by sleep, that excitability which had been exhausted by the labours or by the exciting agents of the day.—We rise with restored excitability.—We feel a new power of excitement in every object around us.—We are refreshed in the morning, and feel languid and fatigued at night; and our whole life is an alternation of action and sleep, of apathy and pleasure; of wasting our excitability by day, in labour or enjoyment, and of recruiting it during the night, by sleep and the abstraction of stimulating powers.”

The same philosophy extends to the duration of life.—“In childhood excitability



is abundant in quantity, as being little exhausted; but it is low in power, because the tender stamina of that period, and accumulated excitability, can neither admit nor support high excitement. The excitability of infants is so abundant, that they are easily supported by weak diet and low exciting powers. In youth, the excitability is yet entire,—the stamina are strong,—the powerful stimuli are applied, and high passions are the effect. This is the period of vigour, and of inflammatory disease. In old age, the stamina are worn and impaired, the excitability is exhausted, the common stimuli have lost their power, and the system begins to decline;—we then have weakness of body, imbecility of mind, and chronic diseases, &c.

“We may last of all, have recourse to more generous diet, and raise the excitement by substituting wine to water, or brandy to wine; perhaps by these means excitement may be a while supported, and life prolonged, but in a few years these also lose their effect.”

According to this doctrine, the living action is never produced but by exciting pow-

ers, as “there is no such thing as a direct sedative in nature.

“In stimuli there is a gradation which, being relative to the system, deceives our senses; for, since some stimuli are powerful and others weak, a less stimulus, applied after a more powerful one, will stimulate less than the former, and suffer the motions excited by the former to subside, and will on that account be considered as a *sedative*.

“Take heat for an example of this; cold is but an abstraction of heat, yet it has hitherto been thought to have a positive existence; and heat has been considered as a stimulant power, and cold as a sedative. To detect this deception of our senses, plunge the right hand into water at the heat of  $150^{\circ}$ , the left into melting snow, withdraw both, and plunge them into water at  $400^{\circ}$ ; this will prove at once stimulant and sedative—cold or sedative to the right hand, and hot or stimulant to the left.—Here we clearly see that the effect is not always the same, but is diversified by the state of the excitability; and as cold is an abstraction of heat, so is fear an abstraction of courage—grief of

joy—despair of hope—so is fasting an abstraction of the usual stimulus of food—bleeding of the usual stimulus of blood, &c.”

On this part of the Brunonian theory Dr. Wilson remarks, that “in proportion as the organs on which the animal functions depend, have been subjected to the action of stimuli, they become less capable of being excited by them; and if their application is continued, the strongest fail to rouse the system to any farther exertion, till a state of sleep, (during which, if it be sound, there is the greatest abstraction of stimuli on those organs,) which is consistent with health, has to a certain degree, renewed its excitability. Such are the laws of the system in health with regard to sleep and watching; and the doctrine of indirect debility is, for the most part, applicable here. But these are not the laws of the system in disease, as supposed by Dr. Brown; and his doctrines of direct and indirect debility are totally inapplicable to the other functions of the body, both in health and disease.”

One great error of the Brunonian theory, is the application of the laws which govern

particular functions or portions of the human system, and that only in the healthy state, to the system at large. This error has been attempted to be corrected by Dr. Rush, in his theory of diseases, as well as by Dr. Wilson in his treatise on febrile diseases.

Having thus stated the outline of the doctrine of health, Dr. Brown goes on to that of disease.

“Health is the due operation of stimuli on well regulated excitability, producing a moderate excitement, and a pleasant sensation; moving the whole system with a just degree of power, and giving to all the functions their due energy and action.

“Disease of weakness is the result of the abstraction of stimuli, or the application of stimuli in too low a degree, or of the system less easily excited.

“Disease of strength is the result of stimuli applied in too great a degree, or of a system too susceptible of excitement.

“The first is depression below the healthy state: it produces languid motions of the several functions; it is named *asthenic disease*, or disease of weakness, corresponding with

the nervous or putrid diseases of former writers, and requires exciting agents for its cure.

“The second is a strong system, wound up to a high pitch of excitement. It is an exuberance of health and vigour, and is marked by violent movements. It is named, in opposition to the former, *sthenic disease*, corresponding to the phlegmasia or inflammatory diseases of other writers, and is cured by abstracting stimuli and diminishing excitement.

“Thus all our diseases depend upon a state of preternatural debility, or upon a state of preternatural strength, and this is the foundation of the scale which has health for its middle point; below this are arranged the diseases of weakness,—above it all the diseases of excessive strength,—and in both divisions of the scale, diseases are so arranged, that the worst forms are set off at the greatest distance from the middle point, to mark them as the widest deviation from the healthy state.

“But to illustrate still farther the nature of these two distinct forms, or classes of dis-

case, we must observe their respective causes. Sthenia, or excessive strength, or contractile power in the muscular fibre, is simply the effect of many or of powerful stimuli acting on the system. Asthenia is the immediate effect of withdrawing these; but asthenia is not so simple as its opposite state; for debility (according to this doctrine) varies in its nature according to its various causes.

“1st. By abstraction of exciting powers, is produced a species of debility named *direct*.

“2dly. By long or violent application of strong exciting powers, the excitability is exhausted; both the excitement and strength of the whole system fail. This species of debility is named *indirect*.

“3dly. When the exciting powers are withdrawn, and the direct debility produced, it is at the same time combined with a new species.—By merely withdrawing the stimuli, such weakness would be produced as should be temporary only, and might be done away by reapplying the usual exciting powers; but where the stimuli are withdrawn, excitability is accumulated; and when it is

accumulated in an undue quantity, it cannot bear the usual stimuli, and will not give out the usual healthy excitement."

This system turns on the hinge of direct and indirect debility; for direct debility, caused by the absence of exciting powers, is attended with accumulation of excitability. Indirect debility, caused by superabundant stimuli, is attended with exhausted excitability; the former is most easily cured, since we have only to apply a due quantity of stimuli, and gradually raise the excitement to the standard of health; the latter is more difficultly cured, because the excitability being in a great degree exhausted, the system is less susceptible; we have, therefore, less excitability to operate upon, for the restoration of excitement and consequent health.

"The abstraction of stimuli is an immediate cause of weakness. High excitement is a state of the system which the excitability cannot long endure without being exhausted, so that stimuli themselves produce ultimate weakness; therefore, since high excitement is temporary only, and has but one cause, while weakness is a permanent state,



and has many causes, the diseases of debility, must, in a very great proportion, exceed in number the diseases of excessive strength, and diseases of excessive strength must, ultimately, end there.”

If 97 of 100 diseases arise from weakness (as taught by this author) an inquiry into the truth of his doctrine must be of the utmost importance.

#### TREATMENT.

“Though there be many individual diseases, there are but two states or different conditions of the system, and two methods of cure. For all those diseases which stand above the point of health, nothing more is required than withdrawing the stimuli of food, drink, heat, &c. or aided by the reducing or debilitating evacuations and abstractions, such as bleeding, purging, &c.

“For all those diseases which stand below the point of health, the natural stimuli of aliment, drink, heat, &c. are to be employed; or the less natural, but more diffusible stimuli of the pharmacopeia, the chief of



which are æther, alcohol, volatile alkali, musk, and opium, or its spirituous tincture, wine and alcohol.

“The agents which cause the one form of disease, are the cure of the other; in the one, we raise the excitement till it arrives at the point of health; in the other, we depress it to the same point: having effected this, by the powers of medicine and regimen, we are to keep it there by the powers of suitable regimen, and moderate exercise, &c.” The great object, in the practice of our author, is to hit the point of health: neither to stop short of that point nor to pass beyond it; for by either practice we miss our aim.

“By profusion of stimuli we may convert a disease of weakness (or of a nervous or typhus character, according to this doctrine,) into a disease of inflammation, or too high excitement, or we may carry it beyond that point into indirect debility.

“By too sudden and copious an abstraction of stimuli, we run into the opposite extreme; converting into a disease of direct debility, what was formerly a disease of too high excitement, or violent inflammation.

“The use of stimuli, in asthenic disease, is to be regulated by the causes. In all cases of indirect debility, in which the excitability has been exhausted, the strength must be raised by the immediate application of more powerful stimuli; after which, these are to be slowly reduced in quantity or strength till the excitability is restored, after which, moderate or ordinary stimuli will suffice to support the excitement of health.”

“In all cases of *direct debility*, where excitability is accumulated, the immediate application of powerful stimuli would destroy the weakened fibres, or occasion convulsive motions in them; weak stimuli must therefore be first used, the superabundant excitability must be first gradually wasted, and the doses very slowly increased till we raise the excitement to the point of health.” It is the peculiar characteristic of this doctrine, that it directs a method of cure, in many respects, different from that of all others. In proportion, therefore, as it is erroneous or correct, it should be estimated, and therefore should be refuted or confirmed.

According to this theory, diseases consist

entirely of a state of excitement, to a certain extent, higher or lower than a state of health; for the author says “Health consists either in moderate excitement, or in such an exhaustion of the excitability as daily occurs, when the sleeping state of the system is induced by the various actions and offices of life; whereas, a state of too high excitement constitutes that form of disease which is accompanied with strong action of the arterial system, and belongs to the class *sthenia*, (or phlegmasia;) and too weak excitement, accompanied with low, weak, or feeble action of the arterial system, constitutes that form of disease which belongs to the class *asthenia*, or preternatural debility.”

The indications of cure, we are told, are to be formed and prosecuted according as the nature of the one or the other form of the disease is indicated by the remote causes to which the patient has been subjected; and not according to the indications of the symptoms, which this author considers fallacious, and apt to mislead; and according to this *hopeful* opinion, which might be suspected to have been fabricated in an hospital of lu-

natics, the excitability, which is only a different name for the vital principle, becomes accumulated in quantity in proportion to the privation or abstraction of customary stimuli, by which the due ratio or relation between it and the healthy excitement had been maintained, and *that, as the powers which support life are diminished, life itself, or the principle on which the phenomena of life depend, is increased.*

But the fact is, that excitability and excitement, instead of being in an inverse ratio to each other, as supposed by Dr. Brown, are observed to decline in an equal proportion through all the different stages and degrees of every disease whose symptoms indicate great debility in the principal functions of the human body; this is particularly evident in cases of typhus gravior, cyanche maligna, &c. According to this doctrine also, by the abstraction of customary stimuli aided by the evacuating remedies, in cases of exhausted excitability, from the application of too strong and too many stimuli, direct debility is said to be superadded to indirect debility; this opinion, however plausible it

may appear, is contradicted by numerous facts.

If the usual refreshing drinks and aliment are withheld from a patient in an advanced stage of malignant fever, or gangrenous sore throat, and only cold water is given, no accumulation of excitability or susceptibility to action will take place; but, on the contrary, the exhaustion and torpor will rapidly proceed, unless counteracted by suitable exciting agents.

If a person, previously exhausted by fatiguing exercise and exposure to the heat of the sun, drinks a large quantity of cold water, or plunges suddenly into a cold bath, the excitability will not be increased, and the sense of exhaustion thereby removed, but, on the contrary, those greater degrees of exhaustion will be induced which dispose to spasm of the stomach, convulsions of the muscles, or to tetanus, &c.

The doctrine of excitability increasing in the whole or some particular portion of the system, in consequence of the abstraction of customary stimuli, appears to be not only exceedingly hypothetical, but is contradicted

by facts familiar to every observing physician.—In the last stage of typhus fever, for instance, when debility is hourly increasing, instead of the excitability becoming more abundant, (which can only be ascertained by the greater or less motion of the living fibres, observable upon the application of stimuli,) the patient is very frequently observed to be insensible to the impression of the most powerful stimuli; and sometimes so insensible, that flies may crawl over that tender organ the eye, without creating any uneasiness. But the circumstances attending the varieties of the *sthenic* or inflammatory class of diseases, entirely refute this doctrine.—In these, the author supposes that the excitement is increased, and the excitability diminished, in consequence of the operation of too powerful stimulating agents. If, however, the state or quantity of excitability is to be measured by the degree of susceptibility to the action of stimuli, who, after a moments reflection, will have the folly to say, that in such cases, the excitability is diminished, when the system, or that part of it which is the seat of disease, is affected by

such stimuli as would not be felt in a state of health.

According to the theory of this eccentric teacher, every variety of the *sthenic* class depends upon a state of excitement to a certain extent above the standard point of health, which he has attempted to exemplify by an imaginary scale, and every variety of the *asthenic* class depends upon a certain defect of excitement below the same; and he teaches that the indications of cure are to be derived from these opposite states of excitement.

In refutation of his doctrine of life, it may be observed, that the actions which are produced in the living body by the operation of stimulating agents, are not the cause of life, as asserted, but merely the phenomena and effect of life, or of the action of appropriate stimuli upon the principle of life.—Life may and does exist, without organic action; but organic action in the living body cannot be produced without the presence of the vital principle, or excitability.—Life is the primary or efficient cause, of which organization is the secondary or instrumental cause; and organic action itself, is the proximate



effect, which proceeds from the impression made by exciting agents upon the living principle seated in the animal solids.

So long as the relation continues to subsist between the excitability or susceptibility of the system to be acted upon, and the powers of the agents applied, it receives the supply that it constantly requires, and the agreeable sensation of health, is the effect.

If life was the forced state that Dr. Brown and his followers suppose it to be, the application of stimulating substances or exciting agents, duly proportioned to the existing state of excitability, would preserve mankind in perpetual health, and render them immortal; for, instead of being *forced to die*, they would be *forced to live* !!

If the principles of his doctrine, relative to the proximate cause of disease, were correct and true, no disease by which the whole system is affected would be incurable; for, if disease depends only upon weakness or strength of the living system, and weakness and strength depend upon different degrees of excitement above or below the standard point of health, and nothing is to be ascribed



to the fault of the solids or fluids; so long as excitability remains, so long as the system lives, and so long as we have at command stimuli of all degrees of power, discernment and judgment in their application would be all that would be necessary to restore the disordered system to a healthy state.

Like the fanciful and enthusiastic Vanhelmont, Dr. Brown unfortunately imagined that genius could supply the place of experience and observation, and rejecting with disdain the facts which had been collected by his predecessors, he rashly formed plans of treatment which, if adopted, would in many cases prove fatal, and particularly in apoplexy, and dysentery, and in the first stage of phthisis pulmonalis, &c.

If disease depends only on excitement to a certain extent above or below the healthy point, and if excitement last no longer than its cause, how comes there to be any permanent disease?

If a man in health, drinks wine to excess one day, and none the next, the excitement immediately subsides and he feels debili-

tated. This is not the case in disease. If perineumony be produced by the excessive stimulus of heat, after previous exposure to cold, as his doctrine supposes, why is it not removed by abstracting that stimulus and exposing the patient to freezing air, or immersing him in a bath of cold water, which is said to operate only by abstracting excess of animal heat?

Another circumstance which shews the incorrectness of the Brunonian doctrine, is, the effect produced by different articles of the materia medica, all of which are pronounced by our author to operate only by a stimulating power.

If all the powers which produce action in the animal machine operated only as stimulants, they must all have one common nature or quality, and differ only in the *degree* of power. But there can be no doubt that individual stimuli differ widely from each other in their nature and mode of action; some produce hilarity, as wine and opium; one produces phrenzy, as the seeds of the belladonna, or deadly night shade; a second, colic, as the acetate of lead; a third, tempo-

rary mania, as the semina stramonii; a fourth, cholera and convulsions, as arsenic and submuriate of mercury; and a fifth, strangury, as cantharides, &c. From this it appears that stimuli differ in quality as well as in degree of power; for if they differ in degree only, then might the first stimulus in a more concentrated form have produced the same effect; of course, *nosology* must be something more than a *mechanical scale*, and our *pharmacopeia*, something more than a *rising series of stimulant powers*; otherwise, opium, æther, and alcohol, as strongest stimulants, could by dilution give out all the lower degrees of stimulant power, and every variety of disease of the asthenic class, should recede before its appropriate degree.

But if ipecacuanha operates upon the stomach, jalap and rhubarb on the intestines—If nitre affects the kidneys, cantharides the bladder, and mercury the salivary glands, they must have some peculiar quality superadded to their stimulant power, and their stimulant power must be only a subordinate effect. If they are stimuli, they are such as

operate only on certain parts of the system, while they have no effect upon others.

If bark cure an intermittent, or mercury the syphilis, which neither opium, æther, nor brandy can do, then it ought to be the chief study of the physician to discover these specific and peculiar powers.

If all stimulants were the same in kind, and only differed in degree, or were uniform in their action, water, heated to a certain degree, would intoxicate, as well as wine or alcohol.

Many other facts and arguments might be offered to prove the imperfection, inconsistencies, and errors of the Brunonian system of physic, and the pernicious tendency of the practice which it inculcates, especially in diseases of a mixed character, such as vernal intermittents, dysenteries, apoplexies, &c.; but as these must be obvious to every person of common discernment, that is acquainted with the animal economy and the rules of inductive philosophy, it would be superfluous to add any thing farther on the subject, in proof of the doctrine of this ingenious teacher being glaringly erroneous in its prin-

ciples, inconsistent with the laws of the animal economy, and dangerous in its application to practice. I shall, therefore, proceed to the consideration of the *Theory or Doctrine of Diseases*, published by the late Dr. ERASMUS DARWIN, author of the elegant poem called “‘The Botanic Garden.’”

According to the theory of this ingenious writer, the sensorium possesses four distinct powers or faculties, which are occasionally exerted, and produce all the motions of the fibrous parts of the living body.—These are

1st. The faculty of producing fibrous motions, in consequence of irritation, excited by external substances.

2d. The faculty of producing fibrous motions, in consequence of sensation, which is excited by pleasure or pain.

3d. The faculty of producing fibrous motions, in consequence of volition, which is excited by desire or aversion.

4th. The faculty of producing fibrous motions, in consequence of association, which is excited by other fibrous motions.

The author considers the exuberance, deficiency, or retrograde action of these fa-

culties of the sensorium, as the proximate cause of every individual disease; and, according to this view of the subject, he has divided all diseases into four classes, according as they depend upon the disordered state of one or other of the above mentioned faculties.

These four classes are divided into distinct orders, genera, and species.

The orders of the different classes are named from the excess, deficiency, or retrograde action of the proximate causes. The genus from the proximate effect; and the species, in general, from the locality or situation of the disease in the system.

The superior advantage of classing diseases according to their *proximate causes*, in the opinion of Dr. Darwin, is, 1st. more distinctly to understand their nature by comparing their essential properties. 2dly. To facilitate the knowledge of the methods of cure; since, in the natural classification of diseases, the species of each genus, and indeed the genera of each order, with perhaps a few exceptions, require the same general method of treatment; and lastly, to discover

the affinity of a disease not previously known, by comparing it with those with which the physician is already acquainted.

Dr. Darwin supposes that the faculties of the sensorium depend upon the presence of a subtile elastic fluid secreted by the brain, which he denominates "*sensorial power*," or the spirit of animation.

In the first volume, page 6th. of his *Zoonomia*, he says "the similarity of the texture of the brain to that of the pancreas and some other glands of the body, has induced the inquirers into this subject to believe, that a fluid, perhaps much more subtile than the electric aura, is separated from the blood by that organ for the purposes of motion and sensation.

"When we recollect (adds this ingenious author) that the electric fluid itself is actually accumulated and given out voluntarily by the *torpedo*, and the *gymnotus electricus*, that an electric shock will frequently stimulate into motion a paralytic limb, and lastly, that it needs no perceptible tubes to convey it, this opinion seems to be not without probability; and the figure of the brain



and nerves seem well adapted to distribute it over every part of the body.

“All bodies possessing life and motion have a peculiar organization, and the muscular parts possess a principle of excitability, or a capacity of contracting and shortening their fibres, in consequence of impressions made on them by external agents.”

The section on stimulus and exertion, in Dr. Darwin's *Zoonomia*, contains the principles which constitute the ground work of his theory; of which the following is a brief abstract.

“1st. There is diffused throughout the animal system, a certain property which may be denominated *sensorial power*, or the principle of animation.\*

“2d. When stimulating substances are applied to the body they produce motion in the muscular fibres by their action upon this sensorial power or principle of animation.” These produce a certain effect which he calls *exertion*, and which by others is called *contraction*.

\* This is what Dr. Brown calls “excitability.”



“3d. If the stimulus be greater than customary, it exhausts the sensorial power; but if the stimulus applied be less than the system has been accustomed to, the sensorial power becomes accumulated and superfluous.

“4th. The exertion (or contraction of the fibres) is varied; first, by the quantity of sensorial power, secondly, by the quantity or forcible impression made by the stimulus, and thirdly, by the proportion which these bear to each other.

“5th. If the sensorial power and the stimuli are in due proportion to each other, and neither have gone to excess, or fallen too low, the exertion and excitement produced, is moderate and regular, and constitutes health.

“6th. When the exertion is too strong, and the excitement too high, either from an excess of stimulus, from an excess of the presence of sensorial power, or from an increase of both, it constitutes disease: and

“7th. When the exertion (or excitement) is much diminished, either from a deficiency of stimulus, or from deficiency of sensorial power, or from a deficiency of both, it also

constitutes disease, but of a different character from the former :

“The diseases of the former kind, requiring depleting and debilitating remedies, and those of the latter, stimulating and invigorating ones.”

From this brief abstract it appears that the theory of Dr. Darwin and that of Dr. Brown, bear a striking resemblance to each other in several particulars; they, however, differ materially from each other in several other respects.

They agree in the doctrine that the application of stimuli will increase exertion or excitement, and that the abstraction of stimuli will diminish it : they agree in supposing that the exertion or excitement, simply varied in degree above or below the usual scale of health in each individual, constitutes disease; and that it constitutes health, when at a medium. They also agree in the supposition that a diminution of action, from the abstraction of stimuli, is accompanied or followed by an increase of sensorial power or excitability.

But though they both agree with respect

to the existence of excitability or sensorial power, Dr. Brown does not pretend to know from what source it is derived, or how it originates; whereas, Dr. Darwin considers it to be a subtile fluid secreted by the brain, and from thence distributed to every part of the living system.

They disagree with respect to the nature of stimuli; Brown supposing them all to be of the same nature, varying only in their degree of power; while Darwin contends that they are different in their nature, some being particularly adapted to act on one part of the body, and some on another; thus "*antimonium tartaratum*, taken into the mouth, produces little or no irritation, but when swallowed produces so great an irritation in the stomach, as to invert its motion and occasion vomiting:" again, *ipecacuanha* acts upon the stomach, mercury on the salivary glands, squills on the kidneys, and *cantharides* on the bladder, and *jalap*, *senna*, *sulphate of soda*, &c. upon the intestines, &c.

Dr. Brown supposed that an increase of either excitability or of stimuli so as to produce an increase of excitement, would pro-

duce an increase of strength; whereas, Dr. Darwin asserts that, to produce strength, it is necessary that the quantity of sensorial power and force of the stimulus should both be increased.

As the theory of Dr. Darwin agrees with that of his cotemporary Dr. Brown, in making disease to consist only in different degrees of excitement above or below the standard of health, the objections which have been urged against the most material part of Brown's, will apply with equal force to the most material part of Dr. Darwin's theory.

Though Dr. Darwin considers stimuli to differ in their nature and properties from one another, he supposes, with Brown, that there is no direct sedative or article of the *materia medica* that produces sedative effects in the first instance, but that all such phenomena are the effects of evacuation, depletion, or abstraction of stimulant agents. The following facts, however, shew this opinion to be erroneous.

“The depressing passions immediately occasion a sense of debility in the vital and natural, as well as in the animal functions.

The effects of fear or grief upon the human body, arising to any considerable degree, are loss of appetite, indigestion, and other symptoms of dyspepsia; and that degree of debility which produces the morbid watchful state. The system also under the operation of the depressing passions, becomes more susceptible of deleterious power, as the miasmata of marshes, the contagion of typhus, &c.

“The same total derangement of the organization, follows the excessive operation of these passions, as well as of those of the exciting kind.

“It has been alledged that the depressing passions are only a diminution or abstraction of the exciting passions, not the emotions of an opposite nature, and that they are therefore to be considered as weak stimuli, and that their operation upon the body is the same as the abstraction of the necessary stimuli.

“This opinion is glaringly incorrect; first, because no power can be considered as stimulant, unless when operating in a certain degree, it has the effect of increasing action

in the moving powers of the system. But fear or grief, operating in any degree, produces debility.

“2dly. It is manifestly absurd, to suppose that grief is merely the abstraction of joy, or fear of courage. We cannot avoid perceiving, that the depressing passions are not mere abstractions of stimulating agents, but are rather powers, which operate with considerable force, inducing direct debility in the system. This class of passions must, therefore, be considered as sedative powers; and the conviction that they are such, naturally leads us to conclude, that there are other substances in nature, which also produce a directly sedative effect upon the body. Such appear to be marsh miasmata, and the contagion of typhus fever.” See Herdman on *Animal life*.

If the gas called carbonated hydrogen, or hydro-carbon, which consists of a mixture of carbonic acid gas and hydrogen gas, or of fixed and inflammable air, be inspired in an undiluted state, it is followed by instant death; and when inspired in a small quanti-

ly only, mixed with atmospheric air, or with oxygen gas, and be continued for any length of time, it induces vertigo, dimness of sight, convulsions, and every symptom of approaching death. Its noxious effects are therefore referable to its action on the nervous system, *upon which it produces directly sedative effects.* From this circumstance, Dr. Bostic observes that “the doctrine of there being no direct sedative power in existence, is one of the most singular contests of theory against experience in modern times.” *Essay on Respiration.*

If the principles of the doctrine taught by Dr. Darwin were true, it would be next to impossible for any person to be deprived of life, by exposure to freezing air in the most dreary climates of the globe, unless there was a total abstraction of heat from the atmosphere; for, though the cold be continued in the same degree, its effects must gradually decrease, from the accumulation of the sensorial power, till at length its influence on the body would be the same as when the stimulus of heat was greater, and the sensorial power less.



The theory or explanation of the phenomena of fevers, proposed by Dr. Darwin, is chiefly founded on a sympathy or association of parts, in consequence of which, it has obtained the title of "*the sympathetic theory of fever.*"

Direct sympathy is used by Dr. Darwin, to express an increase or decrease of motion in the secondary or associate fibres, corresponding with the increased or decreased motion of the fibres of the part originally affected. But it is impossible that the same moving fibres should be excited at one time by direct, and at another by reverse sympathy, or that the same cause should at one time increase their action, and at another diminish it.

If Dr. Darwin's physiology was correct, no inequality could continue for any length of time, between the excitability of different organs or functions of the body; for, if the sensorial power be a fluid, as asserted by Dr. Darwin, and becomes accumulated more or less rapidly, during the existence of a state of torpor, quiescence, or inaction, produced in consequence of too violent stimuli having



previously acted on the same, it would overflow, agreeably to the laws by which other fluids are governed, into every part, till all were on a level, and then every part would be liable to the same or a proportionable degree of action.

If in the intermittent fever, the stomach is primarily affected as this author teaches, the diminution of action in the heart and arteries, during the cold stage, cannot be the necessary result of associate motions, or sympathy with the stomach; otherwise, the slightest degree of indigestion would always be attended with similar symptoms.

In accounting for the accession of the hot fit, our author observes, that "the sensorial power, which would have been expended in the primary fibres in the mode of irritation, and in the secondary fibres in the mode of association, being accumulated during the cold fit, the arterial system is excited to violent action, in consequence of this accumulation, by the agents, which are always more or less in operation so long as life exists."

If the organ or part primarily affected, during the cold fit of fever, be excited by its

accustomed stimulus, and act with less energy, from previous exhaustion of sensorial power, it will, by gradual accumulation, regain its natural quantity, and the organ being then in the same state as before the exhaustion, and the stimulus of the same force, the subsequent violent action cannot be explained on the principles of this doctrine.

If the quiescent or torpid organ, supposed by this doctrine to be primarily affected, was suddenly supplied with a quantity of sensorial power, it might be supposed, after continuing torpid or quiescent a certain time, to glow with unnatural violence; but if during torpor or the cold stage, the sensorial power is gradually accumulated, and less stimulus be applied than usual, the torpor must gradually cease, till at length the body will be affected in the same manner as during its healthy state, as the sensorial power or spirit of animation, will have accumulated in a proportion equal to the defect of the stimulus: but this cannot be the case, as the supply supposed to be secreted by, and derived from the brain, cannot have increased during the cold stage, because of the torpor which

precedes and accompanies that state of the system; there must, therefore, be some other cause for the accession of the hot fit.

During the cold or forming stage of fever, there is a suspension of the circulation in the extreme or minute branches of the capillary arteries in every part of the body. To account for this state of the vessels, is the great desideratum in theory; but, neither this, nor the accession of the subsequent hot fit, can be accounted for in a satisfactory manner on the principles of either the Cullenian, the Brunonian, or the Darwinian theory.

In the production of fever, whether the remote cause be marsh miasmata or human effluvia, Dr. Darwin is of opinion that it makes its first impression upon the stomach; the sensorial power, in the muscular fibres of which it expends by the high excitement produced thereby, and that from thence a similar torpor or quiescence is propagated by direct sympathy or association of action, to the rest of the system: In other words, he considers the remote cause of every species of fever, to be a powerful stimulus; the consequence of the action of which, is indirect

debility, from the expenditure of sensorial power.

In every variety of fever, Dr. Darwin appears to suppose that the remote cause, gradually expends the sensorial power in the muscular fibres of the stomach, till, by the intervention of the cold stage, a fresh supply is generated and accumulated in all the moving fibres of the system, in consequence of which, the susceptibility to stimuli becomes so great that a febrile commotion is excited by stimulants of so low a degree as, in a state of health, would produce no perceivable effect. But from all the symptoms which precede and accompany different kinds of fever, it may be concluded with probability nearly equal to certainty, that the remote causes of fever do not operate in the first instance upon the stomach, and from thence, by associate motions, bring the rest of the system into a similar condition; on the contrary, all the phenomena indicate that the remote causes of fever are introduced into the circulation through the medium of respiration, and thereby carried, by means of the blood, to every part of the system to which

they extend. From the most accurate and impartial inquiry, it appears convincingly clear that not the stomach, but those parts which are open to the air in its passage to the lungs, and the lungs themselves are the only parts which can be considered as altogether, and at all times assailable by the noxious matters mixed with, or floating in the atmosphere; and that it is by the system of absorbents that they find a ready passage to the blood, and by it, to the system generally; and from the symptoms which usually are the consequence of the reception of marsh miasmata into the circulating fluids, it may be inferred that they produce a proportionably greater morbid effect in the nervous than in the arterial portion of the system; whereas, the exhalations from the living human body, labouring under that form of fever called typhus, produce a greater degree of morbid affection in both portions of the system.

If marsh miasmata, the most usual cause of intermittent fever, produced disorder by a stimulating property, their effects would be instantly perceived, like those of other stimulating substances; and instead of a cold

stage, they would necessarily produce the symptoms of the hot stage in the first instance, and the cold stage could only occur after the febrile commotion or increased action, produced by the miasmata, had exhausted the excitability to a certain degree, and thereby induced a sense of debility and torpor of the nervous and muscular parts of the system.

The opinion, that the stomach is the primary seat of fever, is rendered highly hypothetical and improbable by numerous facts. Dr. Cullen, who from his accurate and luminous description of diseases merits the gratitude of the medical world, states that upon the approach of the paroxysm of fever, "the patient is affected first with languor or a sense of debility, a sluggishness in motion and some uneasiness in exerting it, with frequent yawning and stretching. At the same time the face and extremities become pale and diminished in size, and the skin over the whole body, appears constricted and rough, as if cold water had been suddenly applied to it. At the accession of these symptoms, some coldness of the extremities, though lit-

tle noticed by the patient, may be perceived by others. At length the patient himself is sensible of cold, first in his back, and from thence, passing over the whole body. This sense of cold, or chilliness, is what constitutes the beginning of the cold stage; upon the approach of which, the appetite for food ceases, and does not return till the paroxysm be over, or a sweat has flowed for some time. As the cold stage advances, there frequently comes on a nausea or sickness, which often increases to a vomiting of matter that is, in cases of intermittent fever, for the most part bilious.”

Here the dependent condition of the stomach upon the primary moving powers of the system, is plainly to be discerned. The sense of debility, the paleness and shrinking of the face and of the whole surface of the body, the sensation of cold, to which may be added, the smallness and weakness of the pulse, occurring on the first perception of the debility, all shew, that the sensorium or source of the nervous system, is primarily disordered by the cause of the fever, while, at the same time, the state of the stomach is



but little altered, till all these phenomena have taken place. From all these circumstances, it appears that the disordered state of the stomach is, unquestionably, of a secondary or symptomatic nature.

Upon this ground, Dr. Darwin's opinion that that form or description of fever, with weak and frequent pulse and great prostration of strength, (denominated typhus mitior or gravior, according as the symptoms are accompanied with more or less debility or sudden and continued prostration of strength,) is the effect of torpor, or a state of inactivity produced in the stomach by the contagious principle, which gives origin to this disease, expending by its stimulus, the sensorial power or excitability of the muscular fibres of the stomach, must appear to be mere conjecture, unsupported by facts or correct observation.

If, on the other hand, the sensorial power becomes accumulated, as supposed by Dr. Darwin, in consequence of the inaction of the fibres of a particular part of the system, and in consequence of the abstraction of customary stimulus, the most indolent and inac-



tive should be most capable of hard labour and extraordinary exertion; and, instead of being subject to diseases of an asthenic or nervous character, or those in which debility of the nervous system is the most predominant symptom, on this hypothesis, as well as on that of the late Dr. Brown, should be liable to continual attacks of inflammatory diseases; because, during the inaction of the fibres of any particular organ, or of the capillary vessels on the internal or external surface of the body, the sensorial power or excitability would accumulate to so great a degree as to render the application of the usual stimuli insupportable.

On a subject so abstruse, as well as on those that are involved in less difficulty, we are authorised, by the rules of genuine philosophy, to reason only from unequivocal facts and the most correct observations.

From the most careful and impartial inquiry, it appears convincingly clear, that not the stomach, but those parts which are open to the air in its passage to the lungs, and the lungs themselves, are the only parts which can be considered as altogether and at all

times assailable by the remote or occasional causes of fever; the most usual of which, are noxious matters floating in the atmosphere; and that it is by the system of the pulmonary absorbents, that they find a direct passage to the blood, and through it, to the system generally, and by that means, produce a change in the power of the nervous system, and in the excitability or vital principle existing in the heart and arteries, as well as in the involuntary muscles.

It would be unreasonable to suppose that marsh miasmata, or the volatile substances derived from putrefying vegetable and animal substances, when received into the human system, act as strong and direct stimulants, producing indirect debility by expending sensorial power or excitability, when we see them so manifestly aided, in the production of fever, by the abstraction of such stimuli as the patient has been accustomed to; and, particularly, by cold, hunger, fear, and depleting remedies. The previously stimulating power of this cause has never been perceived by the patient on whom it operates, and the very slow progress of the ear-

ly symptoms, which is so frequently observable, is a strong argument against the fact, and against the validity of this doctrine. Nor can the contagion of the jail or hospital fever be a stimulating substance, wasting excitability, and inducing indirect debility, because its effects are favoured, and it is rendered more certain in producing fever by sedatives, such as hunger, cold, fear, grief, and depleting remedies; and because its effects are frequently counteracted by stimulating and invigorating means, applied soon after exposure to contagion. Febrile contagion has less influence over the robust constitution, than over one that is weak and infirm. It generally operates slowly, and the patient feels indisposition for some days before the fever makes its attack.

The most constant phenomena of the intermittent fever, indicate that its source and principal seat is in the nervous system, and particularly in that portion of the sensorium concerned in voluntary motion, or in the fibres of those muscles which in a state of health, are obedient to the will. This, like the effects of digitalis, is more distinctly in-

dicated at the accession, or during the cold stage of intermittent fever; in which case, instead of its cause acting immediately upon the heart and arteries, and increasing their force and fulness, it acts primarily upon the brain; in consequence of which, all the other functions and organs of the body, at first, exhibit a corresponding diminution of power and force of action; but such is the structure and nature of the animal economy, that the heart and arteries soon react upon the confined and distending fluids, in consequence of the stimulus of distension, from the accumulating blood, which being pressed from the extremities through the veins towards the heart, gradually displaces that which was before stagnant in its right cavities, which entering the pulmonary system in its turn, pushes forward successively into the left cavities; first, that which occupied the pulmonary veins, and afterwards, that which had undergone the proper changes in the air cells; when this reaches the left cavities, it stimulates them to action; which at first is feeble, but which, when the excitability is not materially impaired, gradually becomes

stronger. If the reaction or contraction, in consequence of this distension, aided by the additional stimulus of caloric received from the air by means of respiration, becomes sufficiently strong to restore energy to the brain and due harmony between the different functions, health is the consequence; but when the reaction is either too weak or too violent, the feverish paroxysm will continue until such time as an equilibrium, or unison of action, is restored between the different portions of the system.

If the torpid and diminished power of the sensorium, or the proximate cause of the cold stage, should be so far removed by the subsequent reaction of the heart and arteries, that the several functions are restored to due harmony of action, the fever passes off, to return no more.

But on the other hand, when the reaction has been deficient, the fever will only remit, and when it has been so violent as to bring on indirect debility, the blood ceases to stimulate the heart sufficiently to produce sufficient unison of action in the several functions; hence debility gradually increases, and

after a certain period, languor and a sense of cold returns, followed by the same train of symptoms as at first.

In this manner the paroxysms will continue to return, either at regular or irregular periods, according to a number of adventitious circumstances, until, by the constitutional powers of the animal economy or the assistance of art, a reciprocal harmony and unison of action are established between the different functions.

To conclude: If there was no other objection to the doctrine of this ingenious and respectable author, the complexity and intricacy in which his principles are involved, would be sufficient to render its correctness and validity questionable; because intricacy is contrary to the usual simplicity of nature, and because of the difficulty of applying it to any practical use: I shall, therefore, decline any farther consideration of it for the present, and refer the reader for a more ample analysis and refutation of it to a work, entitled "*Observations on the Zoonomia*, by Thomas Brown, Esq. of Edinburgh," published in the year 1798, and to the 24th. vol.

of the *Critical Review*, published the same year.

In a treatise on *Febrile Diseases*, lately published by DR. ALEXANDER PHILIPS WILSON, of Edinburgh, he considers the proximate cause of fever to be “a change in the laws of excitability.”

“We know (says this author) that the laws of excitability, in fevers, are different from those which prevail in health; because the same external agents, the same degree of exercise, the same degree of temperature, the same quantity of food, of light, of sound, &c. which in health, occasion regular and agreeable excitement followed by gradual exhaustion, in fever, produce excessive excitement, followed by increased action.

“The state of the living solids being thus changed, there must be a corresponding change in the effects of the internal agents, the circulating and other fluids; hence proceed the phenomena of fever.

“The *proximate cause* of fever may, therefore, be concluded to be a change in the laws of excitability; in consequence of which,



the same agents no longer produce the same effects.

“When a state either of excessive excitement, or of atony, exists independently of the application of some artificial agent, one of two changes must have taken place; either the quantity, or the quality of the natural agents, or the state of the living solid, is different from that which prevails in health.

“If it can be shewn that the state of the living solid remains the same, it follows that the deviation from health is owing to some change in the natural agents.

“If it can be proved that the state of these agents remains the same, it then follows, that the deviation from health, is owing to some change in the state of the living solids. We may go a step farther: If it can be proved that the state of the natural agents remains unchanged and yet produce effects different from those they produce in health, it not only follows that the state of the living solid is changed, but also, that if the change in the state of the living solid will account for the changes observed in the effects of other natural agents, we are not in any degree to at-



tribute such effects to a supposed change in those agents, there being no occasion for any such hypothesis to explain the phenomena. In fevers, many of the natural agents, caloric, food, light, and noise, for example, evidently remain unchanged; the difference in their effects, therefore, is owing to the change in the state of the living solid. But this change in the state of the living solid, is capable of accounting for the change we observe in the effects of those agents whose conditions we cannot with precision ascertain—as the circulating and other fluids: It follows, therefore, that whatever change may take place in these, during the progress of fever, and however this change may modify the symptoms of fever, it would be illogical to consider too great lentor, acrimony, or other morbid condition of the fluids, as the proximate cause of fever.

“With respect to the hypothesis of fever depending on a change in the state of the simple solids, as the natural agents act not on the simple but on the living solids, it is necessary to suppose a change in the state of the latter; and as this change accounts for

the phenomena of fever, there is no occasion for any other supposition; and farther, as all natural agents excite a morbid action, and as this effect is not confined to any one, but observed equally in every part of the system, what room is there for supposing any one part is affected more than every other? Lastly, with regard to fever being a state of accumulated or exhausted excitability, in the sense that Dr. Brown uses those terms, it is only necessary to refer to the facts which prove that no such morbid state exists. It is true, that the phenomena of synocha, are such as we should expect from an accumulation of excitability; but will a surfeit, or an excessive quantity of distilled spirits, frequent causes of synocha, occasion an accumulation of excitability?

“It appears then that the living solid is so changed, that a change is effected in its laws of excitability, and that this admitted, there is no occasion for the foregoing hypothesis to explain the phenomena essential to fever. Upon the whole then, the following, as far as it goes, would appear to be a just view of the nature of fever.

“Every agent, acting on the system in general, is capable of producing three effects—moderate excitement, excessive excitement, and atony, according to the degree in which it is applied.” The first operation of agents, produces health; the two last, general disease, which has been called fever. If by the application of artificial, or the excessive application of natural agents, either of the two last states be maintained for a sufficient length of time, the living solid is so much changed, that is, such a habit is formed, that the natural agents, applied in their usual degree, produce certain morbid effects, till the diseased habit has been counteracted, which, as in other habits, is the more easily effected the shorter its duration has been. Hence it is, that almost any thing making a strong impression, will remove fever at an early period; and hence, the difficulty of removing a fever, is generally proportioned to the time it has lasted. The means which cure a fever at an early period, that is, produce a crisis, seem either to expel the morbid cause before the morbid habit is effected; as vomiting during a fit of drunkenness,

or break the morbid habit before it has gained force, as cold bathing during the first days of fever. In the more advanced stage, as the morbid habit is corrected with more difficulty, it is corrected more slowly.

“When in *synocha*, we succeed in changing excessive excitement to moderate excitement, i. e. that excitement which is followed by exhaustion, we have removed the morbid habit and of course cured the disease.

“The cure of *synocha*, therefore, depends on the abstraction of stimuli; but as atony is the consequence of excessive excitement, if excessive excitement has lasted for any considerable time, atony will always be evident, previously to the restoration of health: hence it is, that the symptoms of *typhus* (so frequently) succeed those of *synocha*.

“When we succeed in changing *atony* into moderate excitement, we have corrected the morbid state, and consequently cured the fever. The cure of *typhus*, therefore, depends upon the due and judicious application of appropriate stimuli, repeated at short intervals.”

From the preceding statement, it appears

that every form or variety of fever may be considered as depending on irregular excitement, and requires to be treated according to the particular indications of excessive or defective action of the heart and arteries; and not, as taught by Brown, conformably to any graduated scale of stimulation.

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The following is the substance of the doctrine of diseases, of the late celebrated and ingenious DR. BENJAMIN RUSH, *Professor of the Institutes and Practice of Physic, in the University of Pennsylvania*, which he delivered in his lectures with so much eloquence, and in so elegant a style, that almost every one who heard him, embraced his doctrine with a degree of conviction, that is usually produced only by mathematical demonstration.

“As in health,” says Dr. Rush, “there exists a constant and just proportion between the degrees of excitement and excitability,

and the force of stimuli, so, in a predisposition to disease, (which predisposition consists in debility, and an undue proportion of excitability, or preternatural susceptibility to the impression of stimuli or exciting powers,) the ratio between the force of stimuli, excitement, and excitability is destroyed; in consequence of which, stimuli act with a force, which produces irregular action. And when the excitability is comparatively more abundant in the blood vessels than in the other portions of the system, which, from their being distributed in numerous and minute branches to every part of the surface of the body, both internal and external, is frequently the case, from the operation of the remote or predisposing causes of fever, morbid, irregular, or convulsive action is produced in them, by the stimulus of distension from the circulating blood; for the equilibrium or due adjustment between the different portions of the system having been previously destroyed or changed, by the sudden diminution of excitement, in consequence of the abstraction or suspension of the natural and customary stimuli, or from any cause

which has operated with such violence as to diminish their excitability suddenly, the blood becomes unequally distributed, and by acting with an increase of quantity and force in parts not accustomed to either, becomes an irritant to the muscular fibres of the heart and arteries, and thus an exciting cause of fever.”

Dr. Rush asserts, that both direct and indirect debility, (the former of which, he denominates debility from abstraction, and the latter, debility from too powerful or long continued action,) are always succeeded by increased excitability, or greater aptitude to be excited into action by stimuli, and that the different forms or descriptions of fever are entirely owing to the disproportion subsisting between the stimulus received from or communicated by the circulating blood, and the quantity of excitability or aptitude of the muscular fibres of the arteries to be excited into action by the application of that stimulus. His opinion, relative to debility being the predisposing cause of every form or description of disease, is thus stated in the last edition of his “Medical Observa-



tions and Enquiries :” “Indirect debility, as well as direct debility, is followed by an increase of excitability, when it is suddenly induced, or brought on by the violent and rapid operation of stimulating agents; and direct and indirect debility are on a footing, when they are of a *chronic* nature. In both, the excitability is equally expended, and the system is left in a state in which stimuli act with too little force upon it to excite in it the commotions of fever.

“In any variety or form of acute diseases (he says) occasioned by the causes which induce either direct or indirect debility, the debility induced, is succeeded by increased excitability; but this increased excitability is not equally diffused through the system, but is most abundant in such parts as have been most debilitated by the operation of the remote causes; hence the concentration of irregular action, and morbid excitement, that follows the application of disproprioate stimuli;” (that is, of stimuli too strong or too weak for the state of the existing excitability.)

In this circumstance, as well as in that



respecting predisposition to disease, the theory of Dr. Rush differs materially from the theory of Dr. Brown, though it more nearly agrees with that of the late Dr. Darwin in this particular; for Dr. Brown supposes that idiopathic fevers, or those fevers in which the whole system is affected without being connected with, or dependent on the affection of any particular organ, the excitability is equally redundant or defective in every part of the system, proportioned to the degree of the previous action or abstraction of the remote causes, and is not confined or concentrated in any one particular portion or part, more than another; and that the action of stimuli on any one part, extends its effects, in a proportionate degree, to every other part at the same time. Dr. Rush, on the contrary, supposes that the susceptibility to the impression of stimuli (which has received the name of excitability from Dr. Brown, and of the diffused matter of life from the celebrated Sir John Hunter, and the sensorial power or spirit of animation from Dr. Darwin,) exists in a greater quantity in the parts that have been most debili-

tated, in consequence of the operation of the remote causes; all of which, he says, occasion a predisposition to disease by their debilitating effects, either in consequence of the abstraction of natural and customary, or the excessive action of preternatural stimuli, or stimuli to which the patient has not been accustomed; and adds, that all the predisposing causes of disease, whether it appears in the form of phlegmasia or typhus, are debilitating, differing only in degree, and that all the exciting causes, or those which induce irregularity or morbid action in the system, are stimulating—and that all the difference in the symptoms, proceeds from the difference in the quantity or condition of the excitability, and the force or numbers of the stimulating agents applied, or in operation.

Among the remote or predisposing causes he enumerates, with the generality of systematic writers, cold and moist air, fatigue, from too much exercise, fasting or abstemious living, immoderate evacuations, depressing passions of the mind, all of which produce debility, or a defect of healthy excitement, by the abstraction of natural and

customary stimuli, in consequence of which, the excitability increases and becomes superabundant. A similar increase and accumulation of excitability, he says, also takes place soon after, suddenly withholding or abstaining from the artificial stimuli of strong liquors, or highly seasoned aliment, that a person has been long accustomed to. But that in the generality of the different forms of disease, the phenomena or symptoms proceed from the excitability being more abundant in one part of the system than another, in consequence of the remote causes having produced greater debility in one part, than in the rest of the system. Hence, the blood vessels being more exposed to the alternate effects of cold and heat than the other portions of the system, from their being distributed in numerous and minute branches to every part of the surface of the body, both internal and external, they become proportionably *more debilitated*, and of course, their *excitability* becomes greater than in any other part of the system; in consequence of which, they become the seat of fever, the

proximate cause of which, is an irregular action or convulsion of their muscular fibres.

“ When the debility, and consequent excitability, are equally diffused through the arterial system, the disease will not be accompanied with any local affection; but when the arteries of any particular viscus or organ are more debilitated and more excitable than in the rest of the system, an inflammatory affection will be induced in the organ so debilitated and excitable; therefore, as in all ordinary cases of fever it is seated in the blood vessels—all those local affections called pleurisy, angina, phrenitis, hydrocephalus internus, phthisis pulmonalis, hepatitis, gastritis, enteritis, rheumatismus, hydrothorax, ascites, &c. ought to be considered as symptoms only of an original or primary disease in the sanguiferous system.”

The peculiarities in these states of fever, and the circumstances in which they differ from fever unaccompanied with local inflammation, we are told, depend, *1st.* upon local debility and increased excitability, the consequence of that debility, in the part principally affected. And *2dly.* upon the morbid

excitement induced in the part where the excitability predominates, by the stimulus of distension from the blood, and by the effusion of serum, lymph, and red globules in the weakened, excitable, excited, and afterwards inflamed part.

We are also told, that disease, seated in any other portion of the system, depends on the same cause as fever, viz. debility and excess of excitability; and that its phenomena or symptoms are more or less strong and manifest, in proportion to the quantity or state of the existing excitability, which becomes greater or less in proportion as the debility, induced by the remote or predisposing causes, has been greater or less, and the greater or less force of the acting stimuli or exciting causes; and consequently, that the cure of every form or variety of disease is to be effected, or at least attempted, by the removal from, or guarding against the application of the remote or predisposing causes, and in adjusting the force of the existing and natural stimuli, as much as possible, to the state of the debility and existing excitability predo-

minant in any particular portion of the system.

Among the occasional or exciting causes of disease, and especially of fever, Dr. Rush enumerates sensible heat, marsh miasmata, human effluvia, the contagious matter of eruptive fevers, poisons of all kinds, excess in eating and drinking, sudden emotions of the mind, bruises, burns, &c. all of which, he says, act by their stimulating power only, in the production of disease. And, although he acknowledges that fever is often the consequence of *debilitating* causes, without the application of any apparent stimulus, he is of opinion that the circulating blood is sufficient, in such a state of excitability, to stimulate the heart and arteries to more frequent and irregular action.

In treating of the proximate cause of fever, we are told by Dr. Rush, that "fever is a modification of disease, which has its seat in the blood vessels, and consists in an irregular action or convulsion of the arteries; and that this convulsion of the arteries is the proximate cause of fever." This, in common language, is making the disease and

proximate cause the same. But this is a violation of the rules of logic, in which it is laid down as a maxim, that cause and effect are never to be indentified. The irregular action or convulsion of the arteries, in which we are told fever consists, cannot be the proximate cause of fever, otherwise it would be the cause of itself.

If that were possible, every event that occurs in the universe might be the cause of its own existence, which is contrary to experience and therefore inadmissible.

The proximate cause of a disease, according to the correct signification and true meaning of the term, is that cause which is nearest to the effect; and, in medical language, means that condition or circumstance on which disease or a deviation from health directly depends; or from whence the symptoms flow, and which necessarily cease to exist on the removal of that condition or circumstance.

If, therefore, the theory of Dr. Rush were correct, and he reasoned consistently with its principles, in my opinion, he ought not to have considered the convulsion of the arteries as the proximate cause, but as the proxi-



mate effect of the stimulus of distension from the blood acting upon the increased excitability of the arteries; for, according to his own expressions, “the irregular action of the arteries is owing to the action of the stimulus being disproportioned to the increased excitability.”

A strong objection rises against the opinion of the arteries being the primary seat of fever, from the phenomena which are observed to precede and accompany the cold stage of the generality of fevers, unaccompanied by topical inflammation.

The cold stage of fever cannot be accounted for, in a satisfactory manner, on the principles of either this doctrine, or on those of Dr. Brown or Darwin.

Dr. Cullen’s account of the cause of this stage of fever is much more plausible, though it fails most egregiously in accounting for the hot stage.

It is evident, from the circumstance of the symptoms of fever immediately subsiding, upon the removal of any topical inflammation existing in any of the viscera, that the proximate cause of simple fever and that of



inflammation are not the same; though they both betray symptoms of irregular action in the arterial system; otherwise the symptoms of fever would still be continued by "the stimulus of distension from the circulating blood," after the reduction of the topical inflammation, until the excitability of the part originally affected, and that of the rest of the arterial system, became adjusted, or in due proportion to each other. That the symptoms of fever, accompanied by topical inflammation, do cease upon the removal of the inflammation, is a fact too familiar to every one that has seen practice, to be contested.

The fever which accompanies local inflammation, and which is generally accompanied with strong and frequent arterial action, is certainly a very different disease from fever unaccompanied with local inflammation. It differs from simple fever in depending upon the local inflammation, which is its exciting cause. From this, it has its origin, and with the removal of this, as observed by the accurate and experienced Fordyce, it terminates.

The regular increase and decrease of the

paroxysms of an intermittent fever; its spontaneous and often sudden termination, without any change that can be perceived or reasonably supposed to have taken place in the debility, and subsequent increase of excitability, in the arterial system, and at a time when the general debility of the patient has increased to an extreme degree, is a strong argument that intermittent fever, or that form of fever so called, has not its seat primarily or exclusively in the arterial system; on the contrary, from the affection of the nervous system, and from the phenomena which precede and accompany the cold or forming stage, it may be inferred that the nervous system is equally, if not more concerned in its existence and continuance, than the arterial system.

As the most certain method of ascertaining the correctness of any theory or doctrine of diseases, is to subject it to the test of experiment, and by comparing the effects that would necessarily result from the application of its principles to practice, with a mode of practice universally admitted to be beneficial, I will now proceed to inquire what

would be the probable effects of the application of the theory under consideration, for the removal of diseases.

If debility, as inculcated by this doctrine, is always, in acute diseases, succeeded by increased excitability or a greater aptitude to be excited into action by stimuli, and the different forms of fever, with all their varying symptoms, were only owing to the disproportion subsisting between the stimulus of distension from the circulating blood, and the quantity of excitability or aptitude to be excited into action by the application of stimuli, the remedies which have been observed to be the most efficacious in the typhus, and the acute rheumatism, should be reversed; because, as the debility which precedes and accompanies the typhus through its course, is much greater than that which precedes and accompanies the acute rheumatism, the excitability in the typhus must greatly exceed that in the rheumatism. Therefore, to act consistently with this doctrine, instead of applying stimulants in the typhus, stronger than those which the patient has been accustomed to, when in health, those which sti-

multate less should be employed, and the quantity of his blood diminished, to proportion the stimulus of distension to the state or quantity of the excitability; whereas, in the rheumatism the stimulating medicines should be increased without any reduction of the quantity of his blood, that the stimulus of distension might reduce the excitability to a due ratio with the stimuli.

We learn, however, from the most unexceptionable experience, that such practice would be highly inefficacious and improper.

Similar would be the effects of the application of the principles of this theory to tetanus, scurvy, colic, asthma, dropsy, and all the varieties of disease that belong to the asthenic or atonic class.

It may therefore be concluded, that the principles from which this doctrine is derived are incorrect, or that the author of the theory has not explained it with that clearness and accuracy that its importance requires.

If the principles of this doctrine were correct, when the excitability on which certain forms of disease depend, existed to excess in

one portion or part of the system, the disease might be cured by creating an artificial debility in a different part, that it might flow into it from that where the disease has its seat; for, by this method, we are informed by Dr. Rush in his notes on Pringle's Diseases of the Army, "purgatives, by inducing an artificial debility in the intestines, withdraw the excess of excitability from the joints in cases of chronic rheumatism, and thus equalize the excitement between the different parts of the system."

If it was the effect of purgatives, as supposed by Dr. Rush, to withdraw the excitability from the joints and lodge it in the intestines, the practice would be highly objectionable; because, if the artificial debility produced by them in the intestines, withdrew the excess of excitability from the joints, it would also withdraw a proportionable quantity of excitability from every other part of the system at the same time; in consequence of which, an excessive quantity would flow to, and accumulate in the debilitated intestines, and consequently, induce in them a more violent disease, or at least a disposi-

tion to a more violent disease, than the one that would be removed by such means; for, according to this doctrine, debility, in conjunction with an increase of excitability more predominant in one part of the system than in the rest of it, and stimuli, disproportioned in power or force of impression to the state of the existing debility, are the main links in the chain of the causes of every form or variety of disease.

If it was a fact, that the increased frequency of action, which, for the most part, takes place in every variety of fever, is owing to an increase or accumulation of excitability in the muscular fibres of the heart and arteries, it might be expected that this action is to be diminished, either by preventing the system from furnishing those parts with their usual supply, by those means which have the effect of diminishing the energy of the sensorium, as well as of the heart and arteries at the same time; and the means best adapted to produce this effect would be abstinence from aliment, and every kind of drink but cold water, and by diminishing the quantity of blood by venæsection, &c.

But these means, in cases of typhus gravior, or the malignant forms of fever, instead of removing the disease, aggravate all the symptoms, and endanger the life of the patient. The theory, therefore, of the arterial system being the primary and principal seat of idiopathic fever, and that the excitability in that portion of the system is in much greater quantity than exists in them in a state of health, and especially in that form or species of fever denominated typhus, is highly improbable.

If, in such cases, the excitability was accumulated to excess in the blood vessels, instead of having recourse to affusions or ablutions with cold water, to abstract and diminish the stimulus of sensible heat, the utility of which has been sanctioned by repeated and extensive experience, Jennin's machine for the application of dry heat would be much more efficacious; because, a stimulus stronger than usual, applied to the moving powers of the body, makes them, after such application, much less easily excited into action by the natural and customary stimuli; and, on the sudden abstraction of the



stronger and extra stimuli, the motions of the part where the disease has its seat would be less forcibly excited.

Dr. Rush in his defence of blood-letting states, that a dissolved appearance of the blood, in that form of fever which he denominates malignant, "is a sign of the highest degree of excitement and strength of action in the blood vessels, and that its dissolved appearance is owing to the immoderate action of the arteries upon it, which rend and tear it to pieces."

To shew that this ingenious and experienced physician has mistaken the cause of this condition and appearance of blood, I need only appeal to those who have had opportunities of examining the blood, drawn in the latter stage of phrenitis, pleurisy, or rheumatism, and have compared it with that drawn in the latter stage of the typhus gravior, yellow, spotted, or any other form of malignant fever. In the former cases, the blood, while cooling, separates into serum and crassamentum, and becomes almost invariably covered with a thick, tough, white, or buff-coloured substance, resembling size,

jelly, or glue; whereas, in the latter stage of a malignant fever, even in cases which begin with strong arterial action, the blood in a late stage of the disease, does not separate into serum and crassamentum, but remains one uniform homogeneous fluid, resembling coloured water; though, in the diseases first mentioned, the force and action of the arteries are unequivocally many degrees stronger than they are ever observed in cases of the most malignant fever.

If marsh miasmata and human effluvia, acted by a stimulating property, in the production of fever, as taught by Dr. Rush, they would produce similar effects with other direct stimuli, and their action would be principally confined to the arteries, rendered preternaturally excitable by the abstraction of natural stimuli, or the excessive action of artificial stimuli; an increase of power, or at least of action, would appear in them the instant the miasmata were received into the system, and came in contact with the muscular fibres of the arteries: but we learn, from accurate observation, that this is not the case; for persons that are exposed in situa-

tions where marsh miasmata, or the exhalations from putrefying vegetable and animal substances, are most abundant, and under circumstances which dispose them most readily to be acted upon, perceive no sensible effect for several days after such exposure, or after exposure to the contagious exhalations from eruptive fevers. A period always intervenes of different length on different occasions, but always of sufficient length, after such exposure, before any effect is perceived or any alteration observed, especially in the arterial system, to convince any one that is qualified to discern the relation between cause and effect, that these causes of fever do not act primarily on the arteries, or produce their effects by a directly stimulating action upon the excitability of the system. The symptoms of the forming, or early stage of the fever, by no means indicate that they are the effect of stimuli, whose primary action is upon the muscular fibres of the heart and arteries, (which would in part be a revival of the exploded doctrine of morbid matter,) for those symptoms always indicate defect or depression of power in the muscles

that are subservient to the will, in a state of health for some time before an increase of motion or disordered action is perceivable in the arterial system; though from a law of the animal economy which, I believe, has never been perfectly explained, this state of depression is soon after followed by an increase of action, and frequently of strength, in the arterial system.

If the miasmata acted primarily on the stomach, as taught by Dr. Darwin, and expended excitability by excessive action, all the functions of the body would shew signs of vigour the instant it began to act on the excitability of the stomach, before it was followed by symptoms of exhaustion, in the same manner as they do upon receiving wine, alcohol, or other strong stimuli into it; or, if they acted with the force and celerity of the electric fluid, a prostration of strength and suspension of excitability would be the immediate consequence.

According to the legitimate rules of inductive philosophy, it cannot be admitted that marsh miasmata, or the volatile substances derived from putrefying vegetable and animal

substances, when received into the human system, act as stimulants, and produce indirect debility, by expending or impairing the excitability, by a stimulating action or impression; because, we see fever more certainly produced after exposure to those miasmata, by the abstraction, than the moderate addition of certain stimuli—such as the abstraction of the heat of the body, by exposure to the moist and cool air, so common at night, particularly when aided by abstinence, or too scanty supply of aliment and refreshing drinks, and unusual fatigue, previously to such exposure. The previous stimulating power or property of these miasmata have never been perceived by the patient, and the very slow progress and diminution of power indicated by the symptoms, previous to the accession of the exacerbation or hot stage of fever, in cases of intermittent fever, are strong arguments against its being a fact, and against the correctness of the doctrine.

If the theory of disease, which was taught by this ingenious and eminent professor, was correct, every form or variety of disease would require such remedies as have the ef-

fect of inducing artificial debility in other parts of the system, greater than that which exists in the part where the disease is seated, that the surplus of excitability might be drawn from the part primarily affected, and conveyed into other parts, where it was deficient, and the excitement thereby, equalised throughout the system. But if every form or variety of disease consists in different degrees of excitement, above or below the point of health, as taught by Drs. Brown and Darwin, and in the different degrees of irregular action, as taught by Dr. Rush, and these different degrees of irregular action, depend upon the unequal quantity of excitability in different portions of the system, or in different parts of the same portion, and a disproportion between the excitability thus unequally accumulated and the force of the stimuli which act upon it, and the excitability becomes more abundant, in proportion to the abstraction of natural and customary stimuli, as well as in consequence of the excessive action of stimuli, after such action has been suspended for some time, either the theory or practice recommended by Dr. Rush must be

wrong—for blood-letting and other depleting remedies, which he recommends in diseases which indicate too much excitement or too strong action, by promoting artificial debility in the heart and arteries, would occasion a preternatural flow and increase of excitability into them, and consequently, increase the cause on which their convulsive action depends.

The creed that excitability increases, or that the susceptibility to the impression of stimuli becomes greater in proportion to the degree of debility induced by the operation of the remote causes of fever, or, in consequence of suddenly withholding or suspending the action of artificial stimuli, as respects the heart and arteries, is not only hypothetical, but is contradicted by facts that are familiar to every practical physician. In the last stage of the typhus fever, for instance, and in many cases, from its very commencement, (late examples of which have been numerous in the states of Connecticut and Massachusetts, and in the western parts of New York,) when the symptoms indicate great debility, as well as in the asthma and colic.



instead of a corresponding or proportionable degree of excitability, the deficiency of excitability is so great as to require the most powerful and penetrating stimuli to arrest the ebbing tide of life; whereas, in most cases of fever accompanied with, or depending on local inflammation, the mildest stimuli increase the force and frequency of the heart and arteries, and exasperate the symptoms.

If the power of both the vital and animal functions, become impaired or diminished, in consequence of the abstraction of a due portion of pure and fresh air, long fasting, fatigue, and exposure to a lower temperature of the atmosphere than usual, or from the abstraction of other stimuli which habit has rendered necessary to support the healthy action of the system; or from suddenly abstaining from strong artificial stimuli, that a person has been long accustomed to, can it be said, with any degree of probability, that the excitability or principle of animation, under such circumstances, has gone on to increase and accumulate in the system, and that because it has not been expelled or ex-

hausted by the strong and more frequent action, which the application of stimuli occasions, it must have increased and accumulated.

In my opinion, we might with equal reason, expect an effect without a cause; for it would be highly irrational, and incompatible with observation, to expect that the excitability or principle of life, the production and renewal of which, requires the functions of health, should be generated and accumulated in greater abundance, while the system labours under a state of diminished power, as it apparently always does for a longer or shorter time, previous to, and at the time of the accession of fever. The probability is much greater, and more consonant to reason, that the torpor and impaired state of strength in the voluntary muscles, which precede the invasion of fever, would, in a great measure, prevent any additional productive increase or accumulation of the excitability.

According to this doctrine, as well as to those of Drs. Brown and Darwin, the excitability or principle of life, which is a substance or quality, the existence of which is

only known from its effects, becomes increased in proportion to the deprivation of every thing necessary for its production and support; for, as the powers which support life are diminished, life itself is increased, which is extremely improbable, as well as unaccountable; because every effect must necessarily be preceded by, or connected with an adequate cause. Nor does this doctrine correspond with facts; for it is notorious that the phenomena of remittent and typhus fevers, especially when they have a tendency to terminate fatally, indicate that the excitability, instead of increasing or accumulating in a greater proportion as the debility increases, particularly in the vital functions, keeps regular pace with it, or diminishes in an equal proportion as the debility increases. Dr. Rush's directions, and the remedies he recommends for reducing the excitement when too high, and raising it when too low, in every modification of disease, without being influenced by the name by which they are called in the different systems of nosology, which is certainly the only true method of practising with success in the generality

of diseases, furnish a most unanswerable argument against the fundamental principles of his theory. I expect the following facts and enumeration of symptoms and circumstances connected with that description of continued fever denominated typhus gravior, which, with some alterations, are extracted from Dr. Milman's *Enquiry into the Nature and Sources of the Scurvy*, and of (what he calls) Putrid Fevers, published in the year 1783, will satisfy every impartial reader, that instead of there being an increase of excitability in the muscular fibres of the heart and arteries, their excitability is in an impaired or diminished state.

“Though the manner in which the various motions of the body are performed, as well as the more intimate structure of its fibres, may be forever concealed from us; yet there are certain properties of these, taught us by experiment, the existence and true use of which, are as well ascertained as any part of human knowledge.”

That property of the muscular fibre by which, on the application of a stimulus, it is enabled to move and contract itself, is known

to be derived from a principle inherent in its fibre, and which, to a certain degree, continues to exist after all connection is cut off between it and the nerves. For though the destruction of this principle in the muscular fibres, is the certain and immediate death of those fibres, yet there are many causes which may take away sense and motion, and may leave this principle surviving in the muscular fibre; so that when all sense and motion in the animal machine has ceased, and internal stimuli can no longer be applied, we can for several hours, and in some particular animals for several days, by external stimuli, excite the muscular fibres to contraction, in consequence of this principle not being yet extinct in them.

The voluntary and involuntary motions of the body, are all dependent upon this principle.—It is by means of it, that the muscular fibres of the heart, being stimulated by the blood flowing into its auricles and ventricles, are made to contract or react, and to propel the blood. The same vital power in the voluntary muscles, being acted upon by the nervous power directed to them by the

will of the animal, renders them obedient to its purposes. The vital principle is the efficient or proximate cause, whilst the stimuli applied, are only the exciting cause of their motion; for, when the vital principle is destroyed, no motion can be excited in either the voluntary or involuntary muscles by any stimulus whatever.

Fontana, the ingenious and celebrated Italian philosopher and physiologist, has examined very attentively the effects of many of those causes which have a power of impairing the vital principle, and upon the grounds of extensive and judicious experiments, affirms it to be an universal law of the animal economy, that the diminution or destruction of the vital principle in the muscular fibre, gives it a tendency to putrefaction, and that this tendency will be greater or less, in proportion to the force and quickness with which the cause destroying this principle operates. Where the cause is less powerful, and more slow in its operation, and we have time to note with accuracy all the phenomena which succeed the injury of the vital principle, it is observed that the first ef-

fect of the diminution or impaired state of it, is a weakness of the muscular fibre; so that stimuli which could have excited it in health to strong contractions, can only produce weak ones.

An examination of the symptoms of the mildest cases of typhus fever, must satisfy every unprejudiced inquirer, that its occasional cause has induced such a weakness in the muscular fibres, as to prevent stimuli, which, in health, were capable of exciting strong contractions in the voluntary and involuntary muscles, from being able to produce any other than feeble ones. It is also observable in more malignant or dangerous cases of this form of fever, that the fibres become soft and relaxed; the cohesion between the particles composing the fibres are diminished, so that the fibre breaks upon moderate pressure or extension—the extreme arteries appear paralytic, so as to let the blood escape, and the blood itself loses its power of coagulating when drawn from a vein. But if, (*pulsus plerumque frequens*;) the pulse for the most part, is increased in frequency, as stated by Dr. Cullen, and is admitted to



be the case in the beginning of most of the varieties of the typhus fever, be a just part of the character of this disease, may we not conclude, that however the vital principle may be impaired or diminished in the voluntary muscles, so far from being impaired or diminished in the heart and arteries, it is increased. This would be to suppose that the cause which diminishes the vitality or excitability in the voluntary muscles, may increase it in the involuntary ones. This would also be making the quickness or frequency of the contractions of the heart and arteries, the measure of the vital power in their fibres. He who should calculate the power of the heart and arteries, and judge of the quantity of the existing excitability in their fibres, without taking into account either the stimuli applied to excite their contractions, or the force and effect of these contractions when produced, I presume, would be as little likely to form a just estimate of the vital power existing in their fibres on which their contractions depend, as that person would be of having an accurate idea of the weight of a moving body, who, without

considering the quantity and density of the matter it contains, should measure it merely by its velocity. To draw just conclusions, therefore, from the quickness of the pulse, we must examine the sources from which it may arise.

As the vital power appears in these cases to be generally diminished in the system, it does not appear any way probable that it should have suffered no local injury in the fibres of the heart. Instead, therefore, of proceeding from increased excitability accumulated in the fibres, from having been previously debilitated by the remote causes, may not the quickness of the pulse be occasioned by increased irritation?

A minute investigation of this matter, will, in my opinion, teach us that instead of being more irritable, the quick and feeble motion of the vital organ only indicate that it is more irritated.

It is generally admitted that the blood which flows into the auricles and ventricles of the heart, is the stimulus which excites them to contract, particularly that portion which is oxygenated in the act of respiration,

and the effect is always found to be proportioned to the quantity and condition of the blood which enters, and the force with which it flows into the auricles and ventricles of the heart.

When, at the beginning of a paroxysm of an intermittent fever, a constriction and paleness appear on the surface of the body, during which the blood is detained and accumulated in the heart and large trunks of the arteries, the pulse becomes, during the cold stage, very small, frequent, and irregular; the heart seems for a while to labour under the load of blood accumulated in, and distending its cavities: but the vital principle in its fibres not being much, if any, impaired, by the occasional cause of the disease, the blood which accumulates within its cavities, by the stimulus of distension, soon excites it to strong, as well as frequent contractions, by which the blood is propelled with force to every part of the body, and all the symptoms of the hot fit, the heat and redness of the skin, &c. ensue. As the heat comes on, the heart having relieved itself in some degree, the pulse becomes more regular and

full, and in these respects increases, until a sweat breaks out. As the sweat flows, and as the circulation becomes equable in every part, and the heart is no longer stimulated by the blood accumulated from a confined state of the circulation, the pulse becomes softer and less frequent.

But in that species of fever formerly called nervous or putrid, and now typhus or malignant, the vital principle being greatly diminished or impaired, and the actions depending upon it greatly weakened, the heart is unable to free itself from the blood detained in the trunks of the arteries and accumulated in its cavities, which, in that unusual quantity, stimulates it, as in the cold fit of an intermittent, to small and very frequent contractions. In these cases, instead of that glowing heat and redness of the skin, which is so conspicuous in the hot stage of an intermittent, the same appearance of constriction or stagnation of the blood in the capillary arteries on the surface, the same pale or livid colour continues, the same ghastly or inanimate countenance is seen in every stage of the disease, though frequently in different degrees,

at different times of the day; and consequently, the same cause, the impaired state or diminished quantity of the excitability or principle of life, which originally prevented the heart and arteries from propelling the blood through the extreme arteries into the veins, still continues to exist. But this extraordinary cause of the detention of the blood in the large arteries, and in the cavities of the heart, is not the only cause of irritation in these cases. A resistance to the propulsive power of the heart, is also considered by physiologists, among the causes which quicken the pulse. The weight and powerless state of all the voluntary muscles, from the impaired state of the vital principle in their fibres, in malignant fevers, must furnish a considerable obstacle to the propulsive power of the heart, which, though less irritable, is much more irritated than in a state of health, or in other forms of fever.

The blood, then, accumulated about the heart in consequence of the weakness of its contractions, and the increased weight of the muscles rendered inelastic by the occasional cause or causes of the disease, and the in-

creased resistance thereby given to its propulsive power, are causes of uncommon irritation. In some cases of typhus gravior, the vital principle appears to be so much impaired in the muscular fibres of the heart and arteries, that the concurrence of the enumerated causes are not sufficient to produce quickness of the pulse; but when this quickness does occur, it cannot be accounted for so rationally from any other causes as from those which have just been enumerated. This is also confirmed by the circumstance, that if by stimulating and invigorating remedies, we can excite the heart and arteries to contract, for a certain time, with sufficient force to relieve the heart from the load of blood detained and collected in its ventricles, and to force open the extreme vessels, the pulse immediately becomes more full and regular, and less frequent.

But, independent of these suggestions, if the sources of uncommon irritation have not been satisfactorily pointed out, to ascribe the frequency of the pulse unaccompanied with hardness or fulness, in such cases, to an increase or accumulation of excitability in

the blood vessels, would involve us in the most palpable contradictions; our theory, in that case, and practice would be at the greatest variance.

Where the vital principle in the heart and arteries, on which their contraction essentially depends, is but little if any impaired, as is frequently the case in an intermittent fever, stimuli are useless or injurious; how much more would they be so then in cases of typhus gravior, if the excitability became greater in proportion as the strength of the moving powers decreased, as has been taught of late by some of the most ingenious and eminent professors and lecturers of the present age.

So far are stimulating and invigorating remedies from being injurious in cases of typhus or other forms of fever accompanied with great prostration of strength, and low weak pulse, that patients, in such circumstances, unaccustomed to wine, æther, and volatile alkali, not only bear but frequently require such a quantity as at other times would occasion an inflammation of the sto-



mach or brain; or the rupture of a blood vessel.

To restore the contractions of the heart to a healthy state, we are under the necessity to increase the power of its propulsive action, first, by strong and frequently repeated stimulating agents, and to prevent a return of the debility by nourishing and refreshing drinks, tonic medicines, and other invigorating means.

With what propriety, therefore, could we refer the frequency of the pulse, in which the action is so much weaker than in health, in cases of typhus fever, to an increase of that principle, which we find it so necessary to cherish and increase?

That debility so conspicuous in this form of fever, both in the voluntary and involuntary muscles, the petechiæ or livid spots which generally occur in cases that have a fatal tendency, the hæmorrhages from different parts of the body, the tendency to gangrene in parts that have been inflamed by blisters or sinapisms, are all links of the same chain, and are all symptoms of the same proximate cause, the impaired state of

the vital principle or excitability in the muscular fibres. All these phenomena are analogous to those observed by the ingenious Italian philosopher and physiologist Fontana, when the vital principle was intentionally destroyed by the venom of the viper, by the poisonous juices of certain vegetables, and by a violent shock of electricity. Weakness was the first effect—a soft, tender, flaccid, or loose state of the muscular fibres, a diminished cohesion between their particles, a lengthening of the fibres followed in succession, and were the immediate precursors of putrefaction. The tendency and progress to putrefaction, in the higher grades of the typhus fever, is marked by the same phenomena; according to the legitimate rules of induction, therefore, they are to be referred to the same cause—the impaired state or destruction of the vital principle inherent in the muscular fibres.

If there is but one disease, and the whole catalogue of diseases to which flesh is heir to, are to be considered as an unit, as taught by Dr. Rush, because every form or variety of disease is accompanied with irregular ac-

tion, we might conclude by the same mode of reasoning, that there is but one medicine, or that the whole catalogue of remedies contained in the *materia medica* is *an unit*, because every kind and variety of remedy acts upon the excitability or living principle. We might also conclude that there is but one animal, because every animal is a living creature; and all animals possess some common properties, though the figure, habits, actions, and character of some, are entirely different from those of every other description:

“Some being fixed like weeds to perish where they grow;”

Some destined to grovel in the earth (like prisoners in despotic governments,) “shut out from the enjoyment of the common air, and from the free use of their own limbs.” “While others spread their light wings, and mount into the viewless air.” And others “a watry race, cleave ocean’s briny waves.”

We might also conclude for the same reason, that plants and animals belong to the same class of beings, because, like animals, plants have life, and receive support from air and water, are invigorated by heat and light,

and are rendered torpid or languid by cold : But how would such a doctrine lead to a knowledge of their respective characters, properties, offices, and uses?

A doctrine which is not supported and confirmed by unquestionable facts and inductive reasoning, and that does not necessarily conduct to successful practice, instead of being a safe and eligible guide, must tend to perplex and mislead the student and inexperienced practitioner.

An attempt, therefore, to banish from medical studies a systematic arrangement of diseases or nosology, derived from accurate and repeated investigations of the nature and causes of diseases, (a description of the characters or symptoms of which, render those of a particular kind or description, easily distinguished from those of every other kind or description,) and to substitute in its place an hypothesis derived from a mere symptom or effect of an exciting or occasional cause, acting on a state of the system favourable to its action, (for irregular action, confined to its true meaning, is nothing else,) cannot cer-

tainly be justified on the plea of practical utility.

By the rules of nosology, or systematic classification of diseases, the student very soon learns to distinguish diseases of a different nature from one another, and which, consequently require remedies not merely of a different grade in their qualities, but of a different kind; whereas, if he adopts the theory of Dr. Brown, or Dr. Darwin, or that of the more enlightened, ingenious, and enterprising Dr. Rush, he will, until he has by long and diversified experience acquired a portion of the discriminating sagacity of the last mentioned physician, find himself perpetually at a loss to accommodate his remedies to the existing state of his patient's excitability, and bring the different portions of his system to an unison of action. For no man, except by chance, can direct his remedies with unerring aim, who takes uncertain rules for his guide.

To conclude, though the doctrine of diseases taught by Dr. Rush, and particularly his theory of fever, should appear to accord more with the simplicity of the laws of na-

ture, and to appear to be more ingenious and philosophical than any other that has hitherto been ushered into light, yet by simplifying to such an extreme, and attempting to banish nosology or systematic arrangement from medical studies, I am apprehensive, that, if his theory should be generally adopted, to the exclusion of the rules of practice which he has recommended, and which are supported by the experience and writings of the most enlightened physicians of the present age, it would have a tendency to reduce the exalted science of medicine, which has the most important and useful objects for its end, to the degraded condition of a conjectural and uncertain art, and thereby render confusion more confused. And as he has declared himself an advocate for that part of the doctrine of Brown, which considers life to be a forced state, or the mere effect of certain stimuli acting upon the organs of sense and motion, and expressly asserts that thought and the operations of the mind are as much the effect of stimuli acting upon these organs as any other phenomena of life, I am apprehensive that it will have a tendency to lead

the untutored mind, as well as the sceptic, to conclude that the intellectual principle will not survive the death of the body, and that when the lamp of life is once extinguished, it will never again revive. The inculcation of this gloomy and cheerless doctrine, however, was far from the intention of the benevolent and philanthropic author; for, in his introductory lecture in the month of November 1809, he expressly says, "there are many strong reasons to believe that the souls of brute animals, as well as those of mankind, will exist in a future state, as the divine bounty discovered in the gift of their pleasures would be rendered abortive, unless they were placed in a situation to make returns of gratitude for it, in a state of future existence."

If life was a forced state, as has been alleged, the application of exciting agents duly adjusted to the varying state of excitability would preserve mankind in perpetual health, and, as has been already remarked, render them immortal; for, instead of being forced to die, they would be forced to live



so long as exciting agents are applied, or could be procured.

To the doctrine that life is a forced state, it may be objected that this language conveys very incorrect ideas, for the actions which are produced in a living body by stimulating agents are not the cause of life, but merely the phenomena and effects of life, or of the action of appropriate stimuli upon the principle of life. Life may and does exist without the agency of stimuli in a variety of substances, such as the eggs of animals, the seeds of plants, the solids of torpid animals, and, for a time, in those that are deprived of sensation and motion by drowning; and in some, after decapitation, particularly in rabbits, and guinea-pigs, especially if artificial respiration is produced by inflating their lungs, as has been lately proved by the experiments of Dr. Le Gallois of Paris, and Mr. Brodie of London. The principle of life, therefore, or the efficient cause of the phenomena of life, may, and does exist, independent of organic action, but organic action cannot be produced in the human system without the presence of the vital princi-

ple. The question relative to thought and the passions of the mind being the effect of stimuli upon the organs of sense and motion, I shall leave to the consideration and discussion of those that are more conversant than myself with metaphysical subjects, and shall here, for the present, close my observations on the theory and opinions of this learned and ingenious professor, who deservedly held the first rank in his profession, and whose talents and industry do credit to his country.

DOCTOR GREGORY, the present learned professor of the theory and practice of physic, in the university of Edinburgh, has devoted some pages of his memorial to the managers of the Royal Infirmary of Edinburgh, relative to the pernicious system of rotation in the attendance of the surgeons in that institution, to an account and consideration of the different sects that have prevailed in medicine, from the time of Galen, whose system he has stigmatized as being more unintelligible, and where it is intelligible, more extravagantly absurd, than any that had pre-

ceded it, and which, adds this author, of course came to prevail universally, till it was superseded by the systems of Cullen, Brown, Darwin, and the pneumatic chemists of the present day; which he trusts will keep us all alive and merry for a dozen years at least, and when they have served their time, and their hour is come, *nam omnibus manet nox*, will give place to others as good in every respect, and equally fit to amuse the whale, (alluding to an expression of Dr. Cullen, "that theory is as necessary to amuse students of medicine as a tub to amuse a whale.")

In the same memorial, Dr. Gregory asserts that he neither is, nor ever was, either an empiric or a dogmatist. "He would have been a keen dogmatist, but he found at least 99 in the 100 of medical dogmas were false, and many of them *stark nonsense*. He would have been a determined empiric, but that he found at least 99 in the 100 of empirical facts were as false, and more than that proportion of their remedies as insignificant or as dangerous as any of the dogmas of their opponents.

“He has taught the theory and practice of physic in the university of Edinburgh for four and twenty years, without once throwing out a tub to amuse the whale.” “He never thought he had ingenuity to make such a tub, or dexterity enough to manage any of the numberless ready made tubs which were floating around him.” “He observed to his great comfort that he had no occasion to take that trouble, as the whale has always found some *tub* to amuse himself withal, and has never yet shewn the least inclination either to *swallow* or *overset* him and his little bark.

Notwithstanding the preceding declaration, if I have received correct information, Dr. Gregory, at present, teaches in his lectures, “that as all the symptoms which precede the cold or forming stage of fever, unconnected with local inflammation, indicate a defect of power or energy in the functions of the brain, and as all the other functions except the heart and arteries depend immediately upon the functions of that organ, and the heart and arteries depend on it also indi-

rectly through the medium of the nerves which it receives from the medulla spinalis, and in a secondary manner, by means of the organs of respiration; and as all the other functions of the system depend either directly or indirectly upon the state of the functions of that organ for their healthy or morbid action, it may be reasonably concluded that the disorder with which they are affected at the commencement of every species of fever, proceeds from a defect of energy or power in the functions of the brain, as their regulator and support; and consequently, that the nervous system is the seat of fever, and its proximate cause, a defect of power in the functions of that organ, and the spasm of the extreme vessels in every part of the system, both external and internal, which is so conspicuous a symptom of the cold or forming stage of fever, and which continues to subsist, in a greater or less degree, through the whole course of the fever, is only a symptom or effect of irritation occasioned by the circulating fluids on parts rendered preternaturally irritable by the operation of the remote causes, and is not the cause of either

the cold or hot stage, or of the febrile symptoms, as taught by the illustrious Cullen.”

If Dr. Gregory had proceeded with an explanation of the manner in which the hot fit is produced by the increased stimulus given to the heart and arteries, in consequence of the increased respiration which occurs during the cold stage, and had pointed out the chemical changes produced in the blood by means of a quickened respiration, his theory would have been complete, and would have saved me the trouble of adding any thing farther on the subject.

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Having thus given an abstract or summary view of the principal theories or doctrines of diseases, that have been taught at different periods, by the chiefs of the medical schools, and by the most eminent authors, I should now proceed with my proposed attempt to establish a more correct and satisfactory theory of fever, than any that has hitherto been made public; but after a more deliberate consideration of the subject, I have con-

cluded to postpone its publication, until I see what reception the preceding observations on the theories of others, will meet with from the profession. If the reception should be favourable, it will encourage me to hasten the publication of the theory which I have in contemplation; and although I have no pretensions to superior discernment or ingenuity, or to the profundity of erudition of many of my predecessors or cotemporaries, yet so many facts have been accumulated in this inquisitive and enlightened age, and so many improvements have been recently made in different departments of science, that I hope I shall not be thought inexcusably presumptuous, for supposing myself qualified to establish a theory of diseases in general, and of fever in particular, less exceptionable than has hitherto appeared.







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